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NEW HAMPSHIRE AGRICULTURE.

TWENTIETH

ANNUAL REPORT

OF THE

BOARD OF AGRICULTURE

FROM

DEC. 1, 1890, TO NOV. 1, 1891.

BY N. J. BACHELDER, SECRETARY.

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BOARD OF AGRICULTURE.

ORGANIZED AUGUST 23, 1870.

MEMBERS.

MOSES HUMPHREY, *President* . . .	Concord.
GEORGE S. PHILBRICK, *Vice-President* .	Tilton.
CHARLES McDANIEL	Springfield.
JASON S. PERRY	Rindge.
LUCIEN THOMPSON	Durham.
JOHN D. LYMAN	Exeter.
ALONZO TOWLE	Freedom.
GEORGE A. WASON	New Boston.
FREEMAN P. COVELL	Colebrook.
GEORGE W. MANN	Benton.

NAHUM J. BACHELDER, *Secretary*.

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GENERAL REPORT.

OFFICE BOARD OF AGRICULTURE,
CONCORD, N. H., November 1, 1891.

To His Excellency the Governor:

The twentieth annual report of the State Board of Agriculture from December 1, 1890, to November 1, 1891, is herewith submitted.

According to the report of the State Board of Equalization for 1891 there are in the State 71,276 horses, 19,401 oxen, 112,706 cows, 46,827 other cattle, and 119,999 sheep. Compared with the report for the previous year it shows a gain of 3,328 horses and 1,371 cows. The oxen have decreased 3,945, other cattle 8,101 and sheep 10,365. The decrease in the number of oxen, young cattle, and sheep is explained by the fact that stock raising and sheep husbandry have been largely superseded by fruit growing and the raising of garden products to supply the increased local demand of manufacturing places and the growing summer boarding industry. The year has been one of more than usual prosperity for the farmer, as good yields of nearly all crops have been attended by higher prices and more active demands. This has created a feeling of encouragement among those engaged in agriculture in so marked degree as to be plainly perceptible.

No serious outbreak of any contagious or infectious disease has occurred among the flocks and herds of the State during the year. An occasional case of cholera among swine and glanders among horses has been reported. The most common and dangerous disease now existing among the animals of the State is tuberculosis. While this is no new disease

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its increase in recent years has been so marked and the danger therefrom to public health and life so well established that the legislature of the present year enacted a law for its suppression. This act came into effect April 15, and the work has been vigorously prosecuted since that time. It is now too early to make a detailed report of the progress made by the commission having the matter in charge, but there is every reason to expect that the result contemplated in the passage of the law will be attained and a full report will be made in our next volume.

The institute work has been attended by the usual encouraging and satisfactory results and will be found reported on pages 9 to 200 of this volume. The yearly increasing interest manifested by the farmers of the State in the institutes is noticeable and the most efficient service at the command of the Board has been provided. The efforts so successfully inaugurated in 1889 for securing the reoccupancy of abandoned farms and advertising summer resorts of the State have been continued and a report will be found on pages 201 to 236. Over 17,000 pamphlets have been distributed and there is every indication of beneficial results from the practical methods employed. In no direction could money be appropriated by the State and produce better results for the rural sections than in extending the work in this department.

The inspection of commercial fertilizers has been made in accordance with the practice of previous years. The oleomargarine law has been strictly enforced and the producers and consumers of honest butter thereby protected from the fraudulent imitations.

Encouragement has been given in various ways to the agricultural organizations of the State, all of which have been attended by the usual degree of success. The Grange, with increased membership, has continued its excellent record for stimulating more intelligent and successful farming and is regarded with favor by all progressive citizens.

The Granite State Dairymen's Association has been active in promoting the interests of dairying, which has become a leading farm industry in the State.

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The Agricultural College and Experiment Station have had a successful year and are making preparation for still more effective service in the new location. The Grange State Fair excelled all former exhibitions in attendance; also in variety and excellence of exhibits. The New Hampshire Horse Breeders' Association, which held the first meeting during the year, will stimulate more interest in this important and profitable farm industry. Reports of these organizations will be found in this volume.

The various agricultural fairs by county, district, and town associations have been more than usually successful. The creamery associations now numbering more than fifty in the State have been the means of increasing the profits of the farm in many sections. The Board has given much attention to securing reasonable and just legislation for the agricultural interests and early became interested in the acceptance by the State of the Thompson will. The action taken will be found reported in this volume, and, with other influences, secured the establishment at Durham of one of the most liberally endowed agricultural colleges in the country.

Briefly reviewing, the work of the Board for the year may be summarized as follows:

Institute work in the several counties of the State.

Advertising summer resorts and securing the reoccupancy of abandoned farms.

Suppression of contagious and infectious diseases among animals.

Encouragement in forming farmers' organizations.

Inspection of commercial fertilizers.

Enforcement of the oleomargarine law.

Securing just legislation in the interest of agriculture.

N. J. BACHELDER,

Secretary State Board of Agriculture.

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INSTITUTES.

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INSTITUTES.

COÖS COUNTY.

GROVETON.

The first institute of the winter was held at Groveton, December 8, the Board being represented by Vice-President G. S. Philbrick of Tilton, Dr. Alonzo Towle of Freedom, member from Carroll county, and Secretary Bachelder. J. L. Gerrish of Webster, Secretary of the Granite State Dairymen's Association, was also in attendance and assisted in the exercises. On account of repairs being made at the town house the institute was held in the church building of the Methodist society. It was called to order by Vice-President Philbrick who discussed the object and importance of farmers' institutes and introduced Secretary Gerrish who gave a talk on the general principles of stock breeding. The address was accompanied by the use of the blackboard, showing with chalk the forms of different breeds of cows and other farm animals. The secretary of the Board followed, having feeding tables hung upon the stage and using the blackboard also for figuring different rations for both milk and beef stock. The afternoon subjects were treated in rather an informal manner and the session brought to a close at an earlier hour than usual.

At the evening session Secretary Bachelder presided and Mr. Philbrick talked for an hour on "Gather up the Fragments." It will be impossible to give an idea of the many good points made. Among other things the speaker said: "There then is no occupation where there is such liability to waste as

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in farming, many who keep cows do not know which are making the best returns for feed or whether they are feeding more of some things and less of others than are needed. Who can tell whether it is wasteful to raise calves when the milk can find a good market otherwise or how much the skim milk is really worth? I verily believe my best work as a farmer has been done in later years with a stub of pencil carried in my vest pocket.

"We ought conscientiously to put the best of ourselves into our work, whatever it is. He who starts in a given line of farm work and doesn't study and figure to the bottom of it, does not deserve success, nor should he complain if there is no money in it. Slanders have been thrown at the farmer by those who say that we do not work enough — the fact is, gentlemen, we don't think enough! A young farmer should measure himself by his enterprise and intelligence, and remember the agricultural application of the scripture truth, that 'where our treasure is, there our heart is also!' If your boy has any taste for farming develop and encourage it, that his energies may not be among the 'fragments wasted.'"

The speaker then took up the subject of feeding where it was left in the afternoon, and its discussion, and questions following, occupied the first half of the meeting.

The next subject was "Horse Raising for Profit," by Dr. Alonzo Towle. He commenced by giving prices from his father's journal kept sixty years ago, showing that most farm products were as high then as now, with the exception of horses. The price of labor was so much higher now that he did not believe his father had raised a boy smart enough to pay his bills raising the same crops as the father did, although the father was able to pay for his farm and lay by quite a competency.

The price received for horses is now remunerative, if the right class is raised. He denounced raising the heavier class sent from Canada, which supplies us with three million dollars worth annually.

He recommended the raising of French coach horses by the average farmer, or, if the blood is not yet accessible, the nearest

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to it possible. Not only patronize the horse that suits you as an individual, but be sure and learn if he can transmit his good qualities. The breeding of trotters is another thing altogether, but is for a class that can take better care, train and develop them.

After numerous questions on the subject and a rambling discussion the institute was brought to a close.

COLUMBIA.

The institute on the following day was held at East Columbia, the representatives of the Board being re-enforced by the presence of Mr. F. P. Covell of Colebrook, member for Coös county, who presided. The speakers and subjects were the same as at Groveton on the previous day. Numerous questions were asked by the audience and a good degree of interest was manifested. Between the afternoon and evening sessions, the representatives of the Board were handsomely entertained at the house of Mr. E. G. Rogers, one of the best farmers in the vicinity.

CARROLL COUNTY.

SANDWICH.

Vice-President Philbrick, Dr. Towle, Secretary Bachelder, and J. L. Gerrish held an institute at Centre Sandwich, December 11, which was well attended and a deep interest manifested in the subjects presented. Dr. Towle, the county member, presided and the subject of improved stock was quite fully discussed by Mr. Gerrish. This was followed by a general discussion of the subject and many good points were brought out. The secretary followed upon the subject of feed for the dairy, use being made of the feeding charts and blackboard. Mr. Philbrick made a brief talk upon the principles of feeding, after which, adjournment was made until evening.

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The evening session was occupied with an address by Dr. Towle upon the summer boarding industry and by Mr. Philbrick on creameries. Each occupied about an hour and were given the closest attention by an appreciative audience.

MADISON.

An eighteen mile ride on the following morning brought the representatives of the Board to Madison where considerable interest was manifested, although one of the coldest days of the season. The speakers and subjects were similar to those on the previous day at Sandwich. S. A. McDaniel and William Furbush, of Freedom, were present and made interesting remarks.

SULLIVAN COUNTY.

GOSHEN.

The first session of the Sullivan county institute was held at the town hall, Goshen, on the afternoon of January 26. The speakers and subjects were as follows: Hon. Moses Humphrey, "Stock Breeding;" Charles McDaniel, "Sheep Husbandry;" Hon. J. B. Walker, "How we miss it in Farming." The audience was apparently interested and a profitable time was the result.

NEWPORT.

On the evening of January 26, a session was held in G. A. R. hall, Newport, at which the speakers were Secretary Bachelder on "Dairying" and Alonzo Towle on "Horse Breeding." Hon. Moses Humphrey presided and the hall was filled to its utmost capacity. The numerous questions asked the speakers evinced the interest taken in the subjects discussed.

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WASHINGTON.

President Humphrey, with Messrs. McDaniel and Walker, held an afternoon and evening session at the town hall, Washington, on the following day. A fairly good attendance greeted the speakers on their arrival and considerable interest was manifested in the exercises. The subjects and speakers were the same as at Goshen on the previous day.

MERRIMACK COUNTY.

CONCORD.

An institute covering two days, was held by the state Board of Agriculture, at Concord, January 11 and 12, 1891, the sessions being held at Chase's hall.

At 11 A. M. the meeting was opened by the President, who introduced His Honor Mayor Clapp of Concord. Mayor Clapp spoke as follows:

MAYOR CLAPP OF CONCORD.

Mr. President and Gentlemen of the New Hampshire Board of Agriculture:

It gives me great pleasure to be here this morning and tender to you, in behalf of our city, our hearty welcome.

This subject that is before you is something that is entirely new to me. I have no practical knowledge of farming, but I have come here to listen to those speakers who have had experience in that line. As I have no knowledge of what has been said on this subject before, or how it should be treated, it would be very arduous for you to have me attempt to make any speech here at this time. But I am well aware, from what I have read, that this society has done a great deal of good to the people of New Hampshire. And I have the pleasure of knowing that there is one gentleman among us today, who has

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taken a great deal of interest in this society, a man who has given it a great deal of thought and time, a man with whom you all are well acquainted, I think, and to him, your president, the Honorable Moses Humphrey, I have now the pleasure of yielding the floor.

A response to the Mayor's welcome was made by President Humphrey as follows:

PRESIDENT HUMPHREY'S ADDRESS.

Mr. Mayor: In behalf of the Board of Agriculture and friends of the same, we accept your kind greetings as approval of the work which we are all engaged in, especially as it comes from the distinguished representative of the city whose prosperity and growth depends quite largely on its agriculture and the agriculture of the surrounding towns. We hope before closing this series of meetings another advance step in the cause of agriculture will be taken, for one of the objects of these meetings is, by addresses and discussions, to move forward the people so that they will examine into these matters and see where they stand, take an observation of the past and present time, and see if the improvements now going on are worthy of their attention.

It is twenty years since the first meeting of the Board, which was held in this city, and at that time Mayor Jones gave the Board a very cordial welcome as the pioneers in the great work that lay before them. Of the original ten members who met at that time eight have passed on to the better world. Their places have been filled with other distinguished citizens by appointments of the Governors. It has been very gratifying to me to be associated with the gentlemen of the Board who were so willing to do the valuable work gratuitously for the best of all occupations. Our relations together have been very harmonious, and, although of different political and religious views, we never have let politics enter our work but have worked together as one family.

In arranging these meetings it was thought best by the

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members of the Board that we should have some of the best agricultural talent in New England to give us valuable information by their several addresses and discussions, thus giving new ideas and thoughts so that we might move along and keep pace with the progress of the day, for it is self-evident that agricuture of all the branches of industries wants to avail itself of all the improvements in science, arts, and machinery, as well as the best thoughts of the day. In looking back to the days of my boyhood and making the contrast with today it is wonderful and astonishing to witness the great changes in all branches of industries, especially in agriculture, and the customs and fashions at that time. There was no machinery nor improved tools to help the farmer nor household implements to assist his wife in the work of the family. It was all done by the strong arm of industry and endurance.

Then was the wooden mould board plow ironed by the village blacksmith, in fact, all the tools were made by the same party for the work on the farm, such as the scythe, hoes, and forks of different patterns. In the house was the old fire place with crane and hooks to hang the pots and kettles on, with the large andirons, back log, and forestick with wood piled up on them for the fire to do the cooking with, for there were no cook stoves. Baking was done in the brick oven except what might be done in the dutch oven. Occasionally johnny-cakes were baked on wooden plates before the fire. The spare-rib was roasted before the fire, being held by a string attached to the mantle, turned and basted as was required to cook it nicely. There were no friction matches then. If they lost the fire they went to the neighbors to borrow some. To kindle their fire in some families they had the flint and steel. Lights were all tallow candles. The houses and barns were of the most uncomfortable kind. The clothing for the family was all homespun. The cloth was made by the family from the products of the farm and finished by the clothier of the village. The garments were made up by the all-accommodating tailoress and dress-maker, who went from house to house in town to do the work and generally were the encyclopedia of the town,

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knowing all the gossips of the day and always full of news. The horses and cattle were of the most ancient breed, for there was no improved stock then. At that time it was all barter; if any trade was to be made it was, "How can we exchange our stuff?" If any work was to be done, "What can I pay you in?" The products of the farm were all drawn to market by the farmers' teams. In the winter there could be seen sometimes a large number of ox teams on the through traveled roads. The farmers generally traveled in companies of from three to ten, carrying their own grain for their horses and their own cooked food for themselves, buying generally one meal per day as they were strict economists. Sometimes they would indulge in a mug of flip in the evening at the tavern. The public travel was all done by stage coach. In most of the back towns they had the mail but once a week, distributed by post riders or in a one horse gig. There were no railroads to develop the country. Steam navigation was scarcely known only on the Hudson river by a few small experiment boats with the high pressure engines made in a very primitive state. There were no steamships to cross the ocean. Now when we look around at this time have we kept step with the progress of the times. We find the cook stove in the house; the dairy implements of modern improvements a great advance over the past to assist the patient and toiling housewife; the spinning wheel and loom are gone. In the field we find the sulky plow and mowing machine together with the horse rake, tedder, corn planter, and horse hoes, all great improvements over the past. The best blooded horses and cattle for profit and pleasure. Railroads and steamboats for transportation of our crops. With all these advantages have the farmers availed themselves of the surrounding advantages? Do they understand the great problems of to-day so that they can easily solve them? In the first place our fathers had more or less of the virgin soil to cultivate which would produce crops easily. It did not require brain labor as it does today. Now we want to understand our soils, how they should be treated, whether they are adapted to this crop or that, and all the farmers want

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to avail themselves of the best agricultural knowledge of today from papers and books and also from meetings for the discussion of all agricultural subjects when presented by the speakers in their special line of thought. I hope when this meeting closes we can all say it has been a profitable meeting to us all.

I now have the pleasure, ladies and gentlemen, of introducing to you Mr. McDaniel, Master of the State Grange. He is also, we are happy to own, a member of our Board. He will speak to you upon the topic of "Farmers' Organizations."

FARMERS' ORGANIZATIONS.

BY CHARLES MC DANIEL.

Mr. President, Ladies and Gentlemen:

Farmers' organizations are far more numerous at the present time than in the past.

We find that in Italy, in the beginning of the last century, as early as 1723 an agricultural society was formed. A society for improvement in the knowledge of agriculture was instituted in Scotland about the same time. This was of short duration, but the necessity of organization was felt, and another was formed in 1755,—this shared the same fate as its predecessor. In 1783, a number of gentlemen met and organized in Edinburgh for permanence the Highland Society. It held its first annual meeting in 1784 and was incorporated in 1787. Although designed for the Highlands, its power and influence spread all over Scotland, and it was under a royal charter in 1834 called the Highland and Agricultural Society of Scotland. Its earliest efforts were aided by government appropriation. However, its charter was paid for by private subscription. Its membership was then only one hundred and fifty, while now they have over five-thousand. Our experience in the United States is similar.

The most important objects of this organization were to exhibit specimens of stock, tools, and dairy produce in the various towns in that country.

1. Agricultural meetings and general shows of stock, imple-

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ments, and dairy produce held in the principal towns of Scotland.

2. Encouraging a system of district shows, for the improvement of breeds of stock most suitable to the different parts of the country.

3. The encouragement and promotion of a proper system of agricultural and forestry education, by means of powers conferred by a supplementary royal charter in 1856, authorizing "the council of the Highland and Agricultural Society on education" to prescribe a curriculum of study, and to grant diplomas and certificates to students of agriculture who shall pass the requisite examination.

4. The advancement of the veterinary art, by conferring the society's certificate on students who have passed through a regulated curriculum in the Edinburgh veterinary college, and who are found by a rigid examination qualified to practice.

5. The appointment of two chemists for the purpose of analyzing soils, manures, etc., to members, and for promoting the application of science to agriculture.

6. The establishment of an agricultural museum, illustrative of the vegetable products of the country; but this collection has been handed over to the Edinburgh museum of science and art.

7. The annual publication of reports and prize essays on all branches of agriculture and arboriculture, as well as the proceedings of the laboratory.

Other agricultural societies all over Europe and foreign countries have not been a benefit in those distant lands, but have aided us here in America, where our land, as a rule, is owned by those who form the same agricultural organizations in great numbers. Every state has its state, county, and town or local societies.

The present Board of Agriculture was incorporated by an act of the legislature and approved July 2, 1870, consisting of ten members, only one, our honored President Humphrey, is now a member of the Board. The work of this organization has awakened a general interest in the various branches of

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agriculture by holding its annual meetings in different parts of the State, and in each county yearly, by the presentation of papers, essays, and discussions on our great variety of agricultural subjects.

This Board having the welfare of the agricultural prosperity at heart, has given its time and ability to the work, and has aided very materially in promoting a higher and better agriculture.

Every county in the state has had its own organization, called Fair Associations, while several towns have had a Farmers Club, nearly all of which have apparently outlived their day of usefulness and passed into history.

In 1865 a pioneer farmer, O. H. Kelley in Minnesota, in consequence of drouth and failure of crops, was compelled to look for outside employment. He found a place in the Agricultural department in Washington. He was selected by President Johnson to go South and see what could be done to place that wrecked and almost ruined country once more upon its feet.

In January, 1866 he started and spent several months in the work, and while there he became impressed with the advantages for the farmers of his country, of having an organization, above and beyond sectional and party lines, something that would unite them by the "strong and faithful tie of agriculture."

Returning to Washington, he laid his plans before William Saunders, then, as he now is, at the head of the governmental grounds, a man who is known and honored by the farmers, florists, fruit growers, and gardeners of this country.

These two gentlemen, with others in Washington, the sons of farmers, became interested and a new organization was born, and christened by the name of *Grange* or Patrons of Husbandry. From that time, 25 years ago, this organization has grown and waxed strong; although it has had reverses, it has continued to live and thrive, and is now, at the end of a quarter of a century, stronger than ever before.

To perfect this organization it was found necessary, like

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political parties to have a platform, or like the church to have a creed, or like our fore-fathers, a Declaration of Independence. So the farmers have their Grange platform, their creed, their Declaration of Purposes, which is the foundation, the starting point, of this great organization.

It is not the work of an individual but the official language of the order itself, which embraces, town, county, state, and nation. Therefore, it is a national organization. The general objects are: "United by the strong and faithful tie of agriculture, mutually resolve to labor for the good of our 'Order,' our country, and mankind."

MOTTO.

"In essentials, unity; in non-essentials, liberty; in all things, charity."

SPECIFIC OBJECTS.

We shall endeavor to advance our cause by laboring to accomplish the following objects:

To develop a better and higher manhood and womanhood among ourselves. To enhance the comforts and attractions of our homes, and strengthen our attachments to our pursuits. To foster mutual understanding and coöperation. To maintain inviolate our laws, and to emulate each other in labor, to hasten the good time coming. To reduce our expenses, both individual and corporate. To buy less and produce more, in order to make our farms self-sustaining. To diversify our crops, and crop no more than we can cultivate. To condense the weight of our exports, selling less in the bushel and more on hoof and in fleece; less in lint and more in warp and wool. To systematize our work, and calculate intelligently on probabilities. To discountenance the credit system, the mortgage system, the fashion system, and every other system tending to prodigality and bankruptcy.

We propose meeting together, talking together, working together, buying together, selling together, and, in general, acting together for our mutual protection and advancement, as

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occasion may require. We shall avoid litigation as much as possible by arbitration in the Grange. We shall constantly strive to secure entire harmony, good-will, vital brotherhood, among ourselves, and to make our Order perpetual. We shall earnestly endeavor to suppress personal, local, sectional, and national prejudices, all unhealthy rivalry, all selfish ambition. Faithful adherence to these principles will insure our mental, moral, social, and material advancement.

BUSINESS RELATIONS.

For our business interests, we desire to bring producers and consumers, farmers and manufacturers, into the most direct and friendly relations possible. Hence we must dispense with a surplus of middle-men, not that we are unfriendly to them, but we do not need them. Their surplus and their exactions diminish our profits.

We wage no aggressive warfare against any other interests whatever. On the contrary, all our acts and all our efforts, so far as business is concerned, are not only for the benefit of the producer and consumer, but also for all other interests that tend to bring these two parties into speedy and economical contact. Hence we hold that transportation companies of every kind are necessary to our success, that their interests are intimately connected with our interests, and harmonious action is mutually advantageous, keeping in view the first sentence in our Declaration of Principles of action, that "individual happiness depends upon general prosperity."

We shall therefore advocate for every state the increase in every practicable way of all facilities for transporting cheaply to the sea-board, or between home producers and consumers, all the productions of our country. We adopt it as our fixed purpose "to open out the channels in nature's great arteries, that the life-blood of commerce may flow freely."

We are not enemies of railroads, navigable and irrigating canals, or of any corporation that will advance our industrial interests, or of any laboring classes.

In our noble Order there is no communism, no agrarianism.

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We are opposed to such spirit and management of any corporation or enterprise as tends to oppress the people and rob them of their just profits. We are not enemies to capital, but we oppose the tyranny of monopolies. We long to see the antagonism between capital and labor removed by common consent, and by an enlightened statesmanship worthy of the nineteenth century. We are opposed to excessive salaries, high rates of interest, and exorbitant per-cent profits in trade. They greatly increase our burdens, and do not bear a proper proportion to the profits of producers. We desire only self-protection, and the protection of every true interest of our land by legitimate transactions, legitimate trade, and legitimate profits.

EDUCATION.

We shall advance the cause of education among ourselves, and for our children, by all just means within our power. We especially advocate for our agricultural and industrial colleges, that practical agriculture, domestic science, and all the arts which adorn the home, be taught in their courses of study.

THE GRANGE NOT PARTISAN.

We emphatically and sincerely assert the oft-repeated truth taught in our organic law, that the Grange — National, State, or Subordinate — is not a political or party organization. No Grange, if true to its obligations, can discuss partisan political or sectarian religious questions, nor call political conventions, nor nominate candidates, nor even discuss their merits in its meetings.

Yet the principles we teach underlie all true politics, all true statesmanship, and, if properly carried out, will tend to purify the whole political atmosphere of our country, for we seek the greatest good to the greatest number.

We must always bear in mind that no one, by becoming a Patron of Husbandry, gives up that inalienable right and duty, which belongs to every American citizen, to take a proper interest in the politics of his country.

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On the contrary, it is right for every member to do all in his power legitimately to influence for good the action of any political party to which he belongs. It is his duty to do all he can in his own party to put down bribery, corruption, and trickery; to see that none but competent, faithful, and honest men, who will unflinchingly stand by our industrial interests, are nominated for all positions of trust; and to have carried out the principle, which should always characterize every Patron, that

THE OFFICE SHOULD SEEK THE MAN, AND NOT THE MAN THE OFFICE.

We acknowledge the broad principle, that difference of opinion is no crime, and hold that "progress toward truth is made by difference of opinion," while the "fault lies in bitterness of controversy."

We desire a proper equality, equity, and fairness; protection for the weak; restraint upon the strong; in short, justly distributed burdens, and justly distributed power. These are American ideas, the very essence of American independence, and to advocate the contrary is unworthy of the sons and daughters of an American republic.

We cherish the belief that sectionalism is, and of right should be, dead and buried with the past. Our work is for the present and the future. In our agricultural brotherhood and its purposes, we shall recognize no North, no South, no East, no West.

It is reserved by every Patron, as the right of a freeman, to affiliate with any party that will best carry out his principles.

OUTSIDE COÖPERATION.

Ours being particularly a farmers' institution, we cannot admit all to our ranks.

Many are excluded by the nature of our organization, not because they are professional men, or artisans, or laborers, but because they have not a sufficiently direct interest in tilling the soil, or may have some interest in conflict with our pur-

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poses. But we appeal to all good citizens for their cordial co-operation to assist in our efforts toward reform, that we may eventually remove from our midst the last vestige of tyranny and corruption.

We hail the general desire for fraternal harmony, equitable compromises, and earnest coöperation as an omen of our future success.

CONCLUSION.

It shall be the abiding principle with us to relieve any of our oppressed and suffering brotherhood by any means at our command.

Last, but not least, we proclaim it among our purposes to inculcate a proper appreciation of the abilities and sphere of woman, as is indicated by admitting her to membership and position in our Order.

Imploring the continued assistance of our Divine Master to guide us in our work, we here pledge ourselves to faithful and harmonious labor for all future time, to return by our united efforts to the wisdom, justice, fraternity, and political purity of our forefathers.

These are some of the principal "declared purposes" of the aims and objects of this farmers' organization.

Now let us look at some of the results. It will be seen that education is the chief corner-stone of this organization. It shows that the farmer has mind as well as muscle, brains as well as land, and it pays to cultivate both for "knowledge is power." It teaches us not only how to be better farmers, how to get better returns for our work, how to raise a crop, but how to sell it at the best advantage. Not only how to get money but how to get the most out of it.

Farmers have been learning that while they have strength and influence as individuals, "strength united is stronger;" that while individual efforts walk slowly, united efforts travel on flying trains or ocean steamers, that organizations good or bad move the world. The farmer and his interests will be advanced and respected just in proportion as he improves his education in all things that pertain to him in his several relations as a man, as a farmer, and as a citizen.

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The farmer by this organization has been studying the law of supply and demand, trusts, corners, dealings in future, and the transportation question.

He has even taught some of the lessons he has himself learned, to the great corporations who control the commerce of the country, and the end in this direction is not yet.

We have learned about cheap money and dear money, or scarce money and plenty money, coöperative buying and selling, taxation equal and unequal, where more than a just proportion is levied and paid, whether direct or indirect. We have by examination learned of the profits in insurance by life and fire insurance companies, and here let us show the practical workings not only here in New Hampshire but in other states. Our Grange Mutual Fire Insurance company now in operation has property of over $1,500,000 insured among its members since July 20, 1888; with all losses paid and expenses of the officers of the company and incidentals, we have a surplus of over $5,000 on interest out of less than one half the premium charged by our stock companies for three years time. This insurance is as safe and reliable as can be found anywhere. New York has over sixty coöperative or Mutual Insurance companies, having insured over $60,000,000 Patrons' property at an average cost of $1.84 per thousand dollars for three years. Similar companies are in successful operation in several other states with equally as good showing.

One of the late insurance commissioners of Massachusetts says: "The country suffers itself to be taxed annually on immense sums for the support of a numerous army of insurance brokers and super-serviceable agents who produce nothing and are no valuable use whatever. I believe that the people of Massachusetts pay each year for fire insurance a sum beyond its fair cost under an economical administration of the business upon correct methods, equal to annual state tax." Doubtless what is true in regard to Massachusetts is equally true in regard to New Hampshire.

Relief associations and life insurance are also prominent

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features of this farmers' organization. To say nothing about the financial arrangement of coöperative stores, and buying of phosphates, grass seeds, flour, corn, and other grain used in the east, produced cheaply in the far west would be to omit another valuable work of the organization.

The farmers have been learning lessons in politics, the science of government. They have been learning that we are all under the same laws whether democratic or republican; that what will benefit, or injure one farmer will benefit or injure another. Many politicians in both parties have been learning this lesson of late from the farmers.

By this Grange work we have made our homes better and brighter, and our farms better. We have investigated about soils and fertilizers and improved methods, about intensive and extensive farming.

THE PRESIDENT: I wish to inquire about the insurance. Does that branch take anybody from outside the Grange?

MR. MCDANIEL: No, sir. One has to be a member in the Grange in good and regular standing to get the benefit of the insurance.

MR. GERRISH: Mr. President, we have one present with us who will speak to us this afternoon, but I would like to hear him say a few words at this time — Dr. Twitchell, a member of the state Grange of Maine.

DR. TWITCHELL: Mr. President, I am going to speak but a moment. I want to indorse what has been said by your worthy state master, Brother McDaniel, as to the power of organization. It is a watch-word of our era. Organization is everywhere — in all branches of trade, in all fields of labor, social and religious, moral and political, everything is tending to organization; and it seems to me the lesson for us interested in agriculture to learn, is the value of perfect and complete organizations, which may be made of especial benefit to the cause we represent. Here is one organization which has been very clearly outlined by our worthy brother, and I wish I might emphasize what he has said.

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He has presented the financial advantages of our organization very clearly, but I would like to say a word about the social feature of the Grange. Last summer I had the pleasure of spending a week in New Hampshire among the people. I believe, in every place I visited, some sister came to me and told me what the Grange had done for her; how it had broken in upon the isolation of the farm life. "Why," she said, "It has been a new world to me. I am now going around among my neighbors, and have a pleasant time meeting with others." I remember of being at an asylum, and I was asked by the superintendent, "Can you tell me why it is that so large a per cent of the inmates in our asylum come from the farm homes?" There was only one cause that I could give. It was the fact that farmers' wives lived by themselves, lived there thinking upon their work and the maintenance of the house, and they finally broke down under the load which was partly real and partly imaginary, perhaps. A few years later, walking through the same halls with him, I asked him the question as to the per cent of inmates from the farmers' homes then. He stated that it had grown less, and he said, "Do you know, I think the credit of it must be given to the Grange, because, as I talk with the ladies from the farm homes, I find that they tell me what good times they have had in the Grange, and how social folks have been with them."

Over the line, in my own state, we are working upon this problem of organization. We are trying to complete the organization of the Grange, so that we may direct the efforts of all the membership upon certain lines of work which may be necessary for the benefit of the cause of agriculture. Down at our legislature, they do not dare to express an opinion, until they find out whether a man is a granger or not. A man said, "Damn the grangers! there are so many of them here that we do not know whether to pass a bill or not." And I am given to understand that that is about the case up here too. We are now asking our legislature that the appropriation for the board of agriculture be doubled. The bill passed the house without a dissenting voice, none daring to rise and speak against it.

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It has passed the second reading in the senate and is now being engrossed. We asked that the salary of the secretary be increased so that he might give his entire time to his work as secretary, and that a clerk be provided for him. The power of organization is behind that request, and the representatives know that the Patrons of Husbandry are united upon it. We are also working on this great question of taxation, and next Tuesday we are going up in a body to present our views and arguments in favor of the equalization of these burdens.

There is no other way in which work for the benefit of agriculture can be done, I say to you, brothers and sisters — for I see evidences on the faces of some of you that you are Patrons. I also wish to say to you, that you must not be contented with the work that has already been accomplished in the past here in New Hampshire. There is work to be done by you still. I cannot express, at the present time, the power of organization for good. It touches us upon every hand, in our farm work when dealing with the little things that so often perplex us, as well as in the larger affairs of life. It may be used for the uplifting of everything that is good and truthful, and in doing that we are making organization what it was intended to be. By using this power in this way, we may make the farm life happier, and uproot some of the evils which we see to-day and which we all so much regret.

Adjournment was made until 2 o'clock P. M.

Afternoon Session.

The meeting was called to order at 2 P. M., by the president.

The President: I have the pleasure of introducing to you Professor Whitcher of the Agricultural college, at Hanover, and director of the Experiment Station. I think he will give you something that is valuable.

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WORK OF THE NEW HAMPSHIRE EXPERIMENT STATION.

BY PROF. G. H. WHITCHER, HANOVER.

Mr. Chairman, Ladies and Gentlemen:

The subject that was given to me to present to you at this time was the "Work of the New Hampshire Experiment Station." As the chairman has indicated, I am, in a measure, more or less responsible for that work. Yet I do not want you to get the impression that I claim to do it all. I am willing to divide the honors, and, if there are any crosses, to divide those also. I know that there is a liberal discount placed upon people that blow their own horns, and, on that account, in speaking to you of experiment stations, I should much rather talk about the work done at the Massachusetts Experiment Station or at any other station than that of New Hampshire. Still, as I have said, that subject was assigned to me and I consented to take it, on the spur of the moment, perhaps. I feel the more willing to tell you what our work has been, because I think that all those interested in agriculture should know something about what we are doing.

About three years ago, at a meeting in this city, the question of the prosecution of the work of the experiment station was brought up and I spoke upon the subject. Then the field was clear. There was no experiment station in New Hampshire, and I could paint just as bright pictures as I pleased; I could cover the canvas all over with red, and probably did do so, as my hopes for the future were great. Perhaps we have not done so much as we expected to do at that time. I realize to-day, what I did not realize then, that these things take time. I had the impression that money would accomplish anything, and all that was necessary was to have a certain fund of money and the results would appear—that they would spring up like toad stools upon a warm day. But they do not grow in that way, especially in matters of so much importance as that of the experiment station certainly is to the agricultural community. There was a great deal of work

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to be done to get ourselves in position to work. But I am not going to apologize for the work we have done, neither am I going to pat myself complacently on the back, and congratulate myself and fellow-workers with the great results that have been accomplished since the station was started. It is my province to give you simply a statement of that work.

You doubtless all know what the history of experiment stations in this country is. In the first place, fifty years ago, a demand began to be felt for some sort of definite information and instruction in regard to agriculture. Then came the agricultural colleges. Later it was seen that there were two kinds of work in the field of agriculture. One is the scientific field, embracing the knowledge and science of agriculture, and the other is the experimental one, which field is for the benefit of the practical farmer. It is in this latter field that we, at the experiment station, are working. We have two funds, one devoted entirely to the educational part of the work and the other to the experimental part of the work. It is for the use in New Hampshire of this last fund that I am in some measure responsible. The prime object, the principal idea that we have in mind in the use of this fund, is to do practical work, work that can be put to practical use by the farmers of New Hampshire. A great deal of study is spent to do everything so that it shall have a direct and practical bearing upon our farmers. There are certain effects of the work that cannot be measured in dollars and cents. As I said in the farmers' meeting at Manchester this winter, you cannot measure the value of the work of the experiment stations in this country in dollars and cents any more than you can measure the value of the schools and churches of this country in dollars and cents. You cannot tell to-day, what the financial advantages to the state of New Hampshire are, of any of the educational institutions of the state, the Agricultural college, Dartmouth college, or any of the institutions of that nature. We have had to-day illustrations given us in a very clear and vivid manner, of many of the advantages of the Grange, and yet you

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cannot measure them by means of dollars and cents. This work is something in which the farmers of New Hampshire are doubly interested. As an illustration of the practical work that we are doing, we will take an industry which has had marked developements within the past few years — the dairying industry. We thought that was one of the most important interests for the farmers of New Hampshire, and that it should be one of the things that we should consider first; and I may state that the three years that have elapsed have shown us that no mistake has been made in that direction. We have been testing various breeds of animals. We may have been mistaken in selecting our breeds — the individuals. There will always be room for doubt on these points. In speaking on this subject, I am very well aware that it is impossible for any person, or set of persons, to carry on tests involving several breeds of cattle without drawing severe critisim. That was to be expected from the start. Breeders have a special interest in the breeds they are raising, but, so far as the station is concerned, it has no interest in one breed more than in any other.

To give you something of an idea of what extensive preparations we need to carry on this work, I wish to say something in regard to our equipment. Many of you have been at Hanover and have seen our work. I wish you had all been there, for I would rather talk to those who have been there, as they have some conception of the way in which we are doing these things.

We started out with an equipment representing about four thousand dollars worth of live stock to carry on our tests with. The work of the farm is of two kinds. There are two kinds of work which will be carried on by almost any experiment station: viz., those experiments which have to do with plant growths or the raising of crops, and, secondly, those experiments which have to do with the raising of live stock and the feeding of that live stock. All of our work may be reduced to these two branches — animal nutrition and plant nutrition. Of these two, the subject of plant growth must be considered

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the first. We have prepared for the second part of this work with a liberal outfit of live stock. In selecting this live stock, of course, errors of judgment have been made, but about that I have nothing to say. We have also a good farm that is well equipped with the necessary tools and conveniences for carrying on the work. We have built the necessary buildings, including the experiment station, and we have made additions to the barns for the better accommodation of this stock, which has cost us in the vicinity of three thousand dollars. The total amount of money which we have expended in equipment has been some eleven or twelve thousand dollars.

But what have we done? Let me use a quotation which is perfectly legitimate in this connection, — "By their fruits shall ye know them." All experiment stations must be judged by their fruits. I will say that there are two kinds of fruit that have been the result of this experiment station. In the first place, there is one fruit which exhibits itself in the form of bulletins which are sent out every year from the station. Then there is a certain other kind of effect, a perfectly legitimate sort of fruit, which results indirectly from the bulletins themselves and through the medium of various reports that we are constantly presenting to the various farmers of the state. During the last two years we have presented personally through the members of the station staff, to between ten and twelve thousand people the results of our work at such institutions as this and at other places. Not only that, but our work has had its effect outside of the state, for our reports have reached beyond the state lines, and we have been called at various times to go into other states and report on the results obtained.

The station bulletins are sent to about seven thousand farmers in the state. Or I presume that most of them are farmers, although I cannot know them personally. As a rule, they are those persons who have a direct interest in agriculture. Our list includes seven thousand names. We have sent out eleven bulletins, and we have material on hand at

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the present time for about three bulletins more. The work for those bulletins is very nearly completed, and we hope to issue them in a short time.

There was a demand on the part of the law by which the Experiment Station was established, that a certain number of bulletins should be issued the first year, and we were obliged to comply with that demand regardless of the quality of their contents or the importance of the subject matter of those bulletins. But we were more fortunate in that respect than the experiment stations of many other states, because, as you are all very well aware who have taken an interest in the agriculture of the state, Professor Sanborn ten or twelve years ago commenced experimental work upon the college farm. I want to say right here, that I lift my hat to Professor Sanborn every day in the week. He is one of the best men in this country; and when he went from here to a larger field of action, New Hampshire met with a great loss. But that is a digression. I carried on, as far as our means would permit, the same line of work which he had started, and so we had a certain amount of material accumulated at the time the station was established. We had the material on hand which gave us our first three bulletins. I will say here that there are bulletins that we have given out from this station that I am proud of; but of the first three, I cannot say that I am proud. There was a strong necessity for our issuing those. The law demanded four the first year, and four they got; but as far as the quality of the four is concerned, I wish to be excused from saying anything on that point. I don't find any fault with No. 4, but, as far as Nos. 1, 2, and 3 are concerned, they should have been condensed into one. No. 1 treats of the subject of ensilage, 2 and 3 are a continuation of that subject. No. 4 is in regard to a subject that we consider of very great importance to the farmers of New Hampshire, of more importance than any other one subject — the subject of stock feeding. On that line of work we have put in a great deal of hard study and hard work at the Experiment Station. No. 4 gives in as precise a form as would have been feasible

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the scientific principles that lie at the bottom of stock feeding. As to the importance of this line of work there is one point that I will simply allude to, and that is, the saving that may be made through care given to the subject. A saving of one cent per day on each cow in the State of New Hampshire would make a saving of about one hundred thousand dollars during the course of the winter. Yet there are data in that bulletin for the farmer, if he will apply them practically, that will save more than two cents a day on every cow in his stable, and give as good results as he is getting today and perhaps in many instances better. I am satisfied that the results given in this bulletin are substantially correct, and they accord with the feeding experiments that have been going on in Durham, England. I may say right here that ensilage — which is treated of in Bulletin No. 1 — becomes an important factor in this feeding. I believe that one of the most important means of saving in feeding is the careful raising and cheap storing of our crops. It is not that the silo adds anything, that it is of advantage, but simply through the means that it furnishes us for cheap storage.

In Bulletin No. 5 we have another line of agricultural work which relates to the raising of plants, viz., the use of fertilizers. It is true, I think, that three-fourths of all the letters addressed to the station asking definite questions relate to either stock feeding or the use of fertilizers. Those are the subjects that appear to be uppermost in the minds of the farmers, and it is the last one of those subjects that we have tried to treat in Bulletins Nos. 5 and 6. No 5 is more especially a theoretical document, showing what the material is and where it is to be obtained for the feeding of plants. During the last twenty years, and I may say during the last fifteen years, there has been a very great advancement made in the sources of plant food. There are a great many waste products, which a few years ago were thrown away as absolutely worthless, that are being put to good purpose in this way. This may almost be called a day of utilization of waste products. As an illustration of this, let me call your attention to

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the one subject of cotton-seed meal. The cotton-seed was simply worthless not a great many years ago, and now they extract the oil from it and manufacture that oil into hog's lard and into olive oil for use in putting up sardines, etc. And then from that cotton-seed we get the cotton-seed meal, and so on. There has been the same advance made in using other waste products, and the phosphates, nitrates, and potash have been given to us in the form of fertilizers. Our work in relation to fertilizers has been of a broad, practical character. We have not wasted our time and our efforts in testing different brands of fertilizers, because that would be simply useless. The difference is very much in people's eyes, if you will allow me to say so. We think it would be a waste of time at the Experiment Station, or any experiment station, for that matter, to spend it in testing these fertilizers. They all have practically the same composition, and are sold practically at the same price. We have tried to find out, if we could, what kind of fertilizer was best adapted to our soil and climate and to arrive at practical results. While we do not claim that the work done in this line can be of great scientific accuracy, it is of great practical importance in my mind. The results of our experiments I can give very briefly. While the average fertilizer sold and put upon the market, the commercial fertilizer that you buy, contains something like ten per cent of phosphoric acid, thirty-two per cent of nitrogen, and two per cent of potash, the fertilizers that gave the best results in these experiments were those that contain ten per cent of phosphoric acid, twelve and one-half per cent of nitrogen, and ten per cent of potash instead of two per cent. One dollar invested in this latter fertilizer will give you fifty per cent greater income in the way of increase of your crop than one dollar invested in the fertilizer of standard manufacture. That is saying nothing against their goods. It is simply that they are working on the wrong basis, and they are beginning to realize this fact. If you look at the analysis of fertilizers of the standard make, you will see that they are increasing the per cent of phosphate in their goods. The experiment stations of New

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England are exerting a great influence on these manufactures, because it is being found, not only in New Hampshire but in other states in this drift region where the soil is of the same nature as in New Hampshire, that the fertilizers with the greater amount of potash in them are the best.

There is one thing that I want to call your attention to right here. If the farmers of New Hampshire do not put into practical use the results found at the experiment station, then the experiment station will never amount to anything to you as farmers. We may carry on the most careful work at Hanover and arrive at conclusions which are correct, — we will admit that they are correct,— now, unless the farmers accept the conclusions that come from these experiments, they never will be of any use to the agriculture of New Hampshire. That applies to these fertilizers as well as to other things. Unless you put to practical use and test the facts that we believe we have found in these experiments, they will never do any good. The experiment station can do its work, but the farmers must do their work also. So far as is possible, the experiment stations are working in the direction of practical results for the benefit of the practical farmer.

To pass on to another bulletin, bulletin No. 7. That created more sensation in the state of New Hampshire than any other thing that we have done. It was the one thing that was talked about for some time. The subject matter of that bulletin was the testing of dairy apparatus.

Bulletin No. 8 gives the results of feeding experiments with reference to the production of milk. It is a continuation of the work set forth in No. 4. We expect soon to issue another bulletin, carrying on that work still farther.

On No. 9, I consider we have done the most careful work of any of the bulletins we have issued, so far as care and accuracy of the work is concerned. The subject is the effect of food upon milk. Ninety per cent, I think, of the farmers of New Hampshire to-day do not believe the conclusions arrived at in that bulletin. Yet the conclusions are sustained by the work of others who have been experimenting in that same line. The

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farmer generally believes that the change of food affects the richness of the milk. Soon after this bulletin had been issued, I spoke upon this subject at the meeting of the Dairymen's association in Vermont. I said, "If there are any five men in this audience that will agree among themselves as to some definite line of procedure, which they consider will reduce the richness of the milk, I will immediately inaugurate a series of experiments that shall test that particular thing." It is a fact, that the richness of the milk cannot be materially affected by changes of the food. I believe that thoroughly. I am obliged to believe it. I did not believe it ten years ago any more than many of you do now, but I have been driven to this conclusion by actual tests. You can build up a breed of cows that will give richer milk; but given two cows whose milk is of the same richness, and give them such food as will, if possible, affect the quality of the milk and affect it differently —that is, feed differently to each cow—and you will find that from day to day, month to month, and year to year, there will be no material difference in the quality of the milk from those two cows. Certain changes that cannot be attributed to anything in particular, there are. But the changes of food do not materially affect the quality of the milk.

MR. PHILBRICK: You have started with balanced rations in the first instance?

PROF. WHITCHER: No. I do not start with balanced rations, if you mean by that according to the general standard.

Perhaps I ought to make one statement in this connection. That is, that in these experiments the cows should be well fed—have a sufficient amount of nourishment. I do not mean to starve the cow. It does not make any difference whether she is fed on cotton-seed meal, or on corn meal, or shorts, or anything else, provided she gets daily a sufficient amount of nourishment to run the machine and make the milk.

MR. PHILBRICK: I want to ask you one question more. Do I understand from your statement that every cow is born with a certain limit of capacity; and if the food she receives

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produces milk of the quality of the limit of her capacity, any subsequent change cannot vary it?

PROF. WHITCHER: Let me ask you what you mean by limit of capacity—as to quantity or quality?

MR. PHILBRICK: Quality.

PROF. WHITCHER: I mean to say that every cow is so constituted that she will give milk of a certain average capacity as to composition. No matter whether she is fed on cotton-seed or shorts, the richness of the milk will be the same. There is a constant increase in the richness of her milk, which is not due in any sense to the manner of feeding. The longer time a cow is in milk, the richer that milk will be. Secondly, as cows grow older there is a change in the average composition of the milk. What I mean to say is this, that if you feed a given cow in a certain way, the milk will not be the richer or poorer for it. A heifer will not give as rich milk as a cow four years old.

There is another point that I wish to allude to, that has reference to certain changes which take place in the composition of a cow's milk. The cow that gives you a very large quantity of milk, as a rule, does not give very rich milk. At certain seasons of the year, too, they give richer milk than at certain other seasons of the year. The experiments, however, show that there certainly is no appreciable diminution in the richness of the milk when you change from dry food to succulent, in fact, the experiments show a slight increase at such times rather than a decrease.

QUESTION: Will the change in food in any way affect the sanitary value of the milk?

PROF. WHITCHER: Yes, sir. I presume there is a point there. I cannot give you any definite information in regard to that, however. But so far as the flavor and healthfulness of the milk is concerned, I think it can be affected by the food. Of course the cows should have wholesome food. Anything that would affect the physical condition of the cow, would affect the milk in that way.

PROF. BREWER: I will admit all you say in regard to the

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chemical composition of the milk, etc. But were there any experiments made on the characteristics of the fats and cheesy part? The question just asked in regard to the sanitary condition of the milk suggests that question. It has been demonstrated that, by feeding a cow swill slops,—I do not mean brewers' grains,—the amount of cheesy matter in the milk is not diminished and certain persons have argued from chemical analysis that milk from such a cow was as good as any other. On the other hand, I think that in making cheese it has been found that it will not make as good cheese. It behaves differently. I can imagine that the difference may be too slight to be detected by chemical analysis and yet the difference would have an important effect in determining the character of the product. For instance, chemistry may fail to detect any onions or garlic in the milk, and yet the taste will creep into the butter. It suggested itself to me that the unsanitary qualities of the milk might act in the same way—would not be detected in milk, but would have an evil effect upon the human system.

PROF. WHITCHER: That point is a very important one. In the way that I treated the subject, however, that would not come in. In the case of swill-fed cows there are two points to be considered. The constitution of the cow is not kept up. In order to get the amount of nourishment necessary you are obliged to give a very large excess of water, more than is required for her system. There is a certain definite relation between the quantity of water and dry substance, and if you overload her system with water you get her into an unhealthful condition. There is another point. This is the day of microbes. Everything that goes wrong in the world is attributed to microbes. And why should not we? We find that germs of disease get into the system of the cow and are carried to the milk. There may be germs of disease in the swill and there may be a direct transfer of some disease in the case of typhoid fever. This much is true. The germs of typhoid fever have been traced very certainly through the system of the cow to the human subject, and there you get typhoid fever. There

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is another point that comes up here in connection with the subject of milk, and I want to speak of it, because it is a point that ought to be taken into consideration by the legislature. It is with reference to tuberculosis. The germ of tuberculosis, if it gets into the lungs and system, will often terminate in consumption, and if there is anything we want to avoid it is consumption. Although at the present time there is every reason to suppose that the discoveries of Dr. Koch will, to a great extent, check that disease, this subject should be carefully considered in the interests of health. As the gentleman says, there may be things in the milk that the analysis of the chemist will not discover.

A MEMBER: Three years ago, when we started our creamery, we ran for two or three weeks and it took a certain amount of milk to make a pound of butter. Suddenly, the next week it took a larger quantity of milk to make a pound of butter. Our man that ran the creamery found fault with the separator. It was discovered, however, that down next to us they had the same trouble with their separator — that it took a good deal more milk to make a pound of butter that week than it did the week before. Come to find out, the week that it took so much milk to make a pound of butter, it rained the whole week, and those cows were out at pasture.

PROF. WHITCHER: Professor Roberts made some experiments at the Ithaca Station in New York that seemed to show that stormy weather had some effect on milk, but I do not think it is attributed in any way, shape, or manner to the food. It may affect the nervous system of the cow and thereby affect the milk. There may be something of that kind from stormy weather, but I very much doubt if you would find that sufficient to noticeably affect it. I should suspect that, if you got at the bottom of the matter, there was some other reason, aside from the mere fact of stormy weather. Sometimes milk is affected by the excess of water, when the water does not come in contact with the cow.

MR. GERRISH: You said something about increased richness of milk as the heifers advanced in years. Have your

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experiments been made with older cows, so that you can draw any line at the point where they generally begin to fail?

PROF. WHITCHER: Personally, not. But as I understand the matter, the decline does not commence until the animal begins to get along in years — at the time when her system begins to fail.

MR. CURTIS: It is just so with the heifer? She gives richer and richer milk until she stops growing?

PROF. WHITCHER: Yes, sir. So, too, if the animal is sick, she may give a different quality of milk. But so far as she is healthy, the food does not affect the quality of the milk.

PROF. BREWER: I should like to add one word to what has been said. I have been indirectly connected with the Connecticut Station for a long time. We were the first state in the Union to have an agricultural experiment station. We commenced with the farmers about eighteen years ago, and talked up the matter of an experiment station with them. We work in a somewhat different line from what they do here, partly because of the situation and partly because of the laws.

I have seen from time to time the bulletins of that station. Their work has not been all original work. They have done a good deal of work that every and any station does, and which they must do in order to do their duty, although, perhaps, you may not see any practical results. Some of the work is negative work, that is, work that they have to do in order to prove that certain things cannot be done. Then, too, there is a good deal of scientific work in which the results come about but slowly. But I think, if you will take their work during the years they have run and see the advance that has been made in agricultural science, you can appreciate to some extent the value of the experiment stations.

There is a good deal of work that cannot be done by the farmer, because he has not the means or the time to devote to it; and there is a good deal of work that can be done by the farmer that no station can do so well. This is a coöperative work. The station has the scientific part of the work to do, and the farmers themselves have to make the applications and

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put into practice the results of the work done there. As I have been listening to this discussion, I have a slight suspicion that the farmers and the professors misunderstand each other. Now, the professor works in the laboratory, and certainly does good chemical work. The farmer works in his fields and around his dairy. I believe that it is for the farmer, and for him alone, to manage his dairy so as to improve the quality of the butter. It is the station's business, and that is just what the station is trying to do, to show the farmer how to get the largest amount of butter from his milk. The making of good butter is an art, and the farmers are the ones to acquire proficiency in that art. It is his business to become skilled in making the best quality of butter, and that is just what he is doing. I think the fact that a very little onion or something of that kind has such an effect on the butter often leads the farmers to over-rate the influence of food upon the chemical composition of milk. That is my impression.

THE PRESIDENT: I now have the pleasure of introducing Dr. George M. Twitchell, of Fairfield, Maine, lecturer of the Maine State Grange and Secretary of the Maine State Agricultural society, who will address you on "Profits in the Poultry Yard."

PROFITS OF THE POULTRY YARD.

BY DR. G. M. TWITCHELL, FAIRFIELD, ME.

Mr. President, Ladies and Gentlemen, of New Hampshire:

As I was sitting in the back of the hall, looking over the audience, I felt as though the people were not present that I wanted to talk to. Your honorable secretary has asked me to speak upon the business side of the poultry question.

Now, the gentlemen and ladies who are present and engaged in poultry raising are interested in it perhaps not as a business, but are those who have been giving it some study from a scientific point of view.

I am asked to treat the question from the every-day, working farmers' standpoint, and, therefore, if I do not take up

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phases of the question along the lines you have been working, I trust that it may not be uninteresting to you, and also that the report may reach a larger section and those who are looking for a livelihood in this business. I would that I might speak directly to the farmers of New Hampshire.

I think, Mr. President, that I may very likely repeat some of the things said last winter, although I have been particular not to read that part of your report, for fear I might be the more apt to incorporate some of it into this talk.

A building for fifty hens should not cost over thirty-five or forty dollars. Such a building, ten by twenty feet with a door at one end, can be finished up complete and ready for occupancy for that sum. First upon the ground put a foot of small stones, if you have any, then upon those place the sills, and the drainage will be complete.

QUESTION: How large would you have the building?

DR. TWITCHELL: Ten by twenty feet. I would not allow more than five foot space to the hen. That allows for forty to fifty hens.

QUESTION: Would you advise keeping fifty in one flock?

DR. TWITCHELL: That depends upon how much time you can give to them. If I were going to keep a thousand hens, I should make about a dozen or more of those houses six rods apart; divide the number among those buildings and shut them in for forty-eight hours. After letting them out, you would be surprised to see how they will find their way home. Each one will return to its own place at night.

QUESTION: Would you have artificial heat in the winter?

DR. TWITCHELL: No, sir. I do not believe it is profitable for the farmer, unless doing a heavy business occupying his entire time. There are many things which enter into that question, in order that an intelligent answer may be given.

MR. GERRISH: Have you ever seen any trouble arising from too much glass in the hen-house?

DR. TWITCHELL: Yes. In a building of that kind one or two windows on the side would be enough, the glass being eight by ten or ten by twelve—twelve lights.

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MR. GERRISH: Would you put in double windows?

Dr. TWITCHELL: If I wished to go to that expense. But you would be surprised to find how comfortable a building of the kind I have described would be with fifty hens in it. Of course, water would freeze under the windows, but it would not be cold enough there to freeze the combs. I rather the temperature would run down a little than to have it too warm. I do not want the temperature in my hen-house to be above 40°. If it is too warm it has a tendency to weaken the condition of the hens.

MR. THOMPSON: Would not the temperature be a little different according to the breed of hens you have?

DR. TWITCHELL: Of course; if you have hens with large combs, there would be more danger of those combs freezing. But with fifty hens in a hen-house such as I have described, you could get considerable warmth. The difficulty with artificial heat is to maintain an even temperature, something which must be done to preserve health.

MR. THOMPSON: From what breed do you get the best results?

DR. TWITCHELL: That depends upon what your fancy is —whether you are working for eggs or poultry. I was interested in an article that I have seen, written, I think, by Brother Connor, in which he gave a smart blow to this general purpose business, and I want to indorse it. There is no room for general purpose to-day, whether it is in breeding dairy cows, in keeping horses or hens. We want to find out what we have the best adaptability for and work for that. Then you want to get a machine that is best fitted for your purposes. A manufacturer of a certain kind of cloth selects the looms that are best fitted for manufacturing that cloth, and so the person who undertakes to do anything with hens, first wants to decide whether he will work for eggs, or to raise chickens for the market, and then select that breed which is best fitted for the special work. After all, it is not so much the breed as the individual hen. Yet, by selecting with care, you may avail yourselves of work done by others in the past

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and so save time. To repeat, this thought of breeding for a general purpose has no place in the market to-day. The general purpose idea has no place anywhere, whether it is in education or in the raising of stock. We, who are keeping hens, want our fowls to do a certain kind of work. One family may be fitted for egg producers, and another, at the same time, have tendencies which make them good for poultry, because these have been bred with the main thought of making poultry, and we must take advantage of that previous work. There was a time when this general purpose idea was good, but not to-day. Conditions are constantly changing, and we must change our practices of farming to accord with them.

Egg producers have a longer and narrower body with legs nearer together, a body adapted for egg building; but for poultry you want a wide body, square on the back, legs apart, and a full, deep, broad breast. You want a body that, when dressed, shall give the smallest per cent of waste possible and the heaviest weight. You cannot combine those two features and secure the highest excellence in either. It is only by keeping the two types separate that we can get the best results in breeding in either line. When it comes near the breeding season, the time when you want to raise your chicks, go out and select from your flock, of say fifty hens, those that are adapted to the end you have in view, and get a pure bred male to put with them. It is in that way that I believe the farmer can do the best—make the most money. The ordinary farmer cannot well go out and buy a flock of pure blood hens and be able to continue the standard of the pure blood breeder who preceeded him; but he may improve the quality of his own stock by buying a pure bred male, and in that way obtain the benefit of the years of breeding which has brought the breed up to that high standard of egg production or flesh forming, as the case may be. In this way a man will at once increase the number of his eggs or the weight of his fowls. In this way the specialist becomes a public benefactor, and you reap the full fruit of all his years of patient effort. Select a dozen of

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your best hens and put by themselves, putting your pure bred male with them. If a farmer wants to get a flock of pullets that will give him the largest number of eggs, then his selection from the breeding stock must be from among the very best layers.

Another thing that I wish to say in this connection. In order to improve the excellence of your flock, it will be necessary to be continually weeding, weeding, weeding, just as you have to keep killing or selling from a herd of cows, in order that the average of the whole may be increased, and individual merit secured.

Next, we come to the question of feeding. Here is a problem very easy for me to solve in theory, but difficult to carry out in practice. It is very easy to say, feed egg food, if you want eggs, and to name the kind of food best adapted to the producing of eggs; but at the same time, I have found that in attempting to carry this out, it is a very difficult thing to feed so as to get the eggs. If these problems could be easily solved they would lose all interest. We have injured our flocks in the past and also the standard of the product, by feeding so much corn. Feed more oats, more wheat, more barley, and some corn; feed meat scraps, and vegetables, feed clover in abundance.

MR. PHILBRICK: Potatoes?

DR. TWITCHELL: All vegetables.

MR. PHILBRICK: Boil your potatoes or feed them raw?

DR. TWITCHELL: Feed nothing raw, except occasionally some onions and chopped cabbage.

QUESTION: Feed meat?

DR. TWITCHELL: Meat scraps every day to the amount of five per cent of the cooked food.

MR. PHILBRICK: Is that raw or cooked?

DR. TWITCHELL: Cooked — scraps that have been cooked. I have made some experiments with meat scraps and also with animal meal, and I have the impression that the meal is more valuable because there is less per cent of water in it.

MR. THOMPSON: I wish to ask the question whether the Leghorn will eat more than the larger breed?

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DR. TWITCHELL: I don't think they will eat any more than the Plymouth Rock, the Wyandotte or the Brahmas; but I do think they would eat more than I should give the larger breeds, for if fed liberally these take on fat. The Leghorns are so active that they will take care of all you give them, and that is one objection, perhaps, to the breed. It would be with me because I want to study the cost of production.

QUESTION: Then you would not feed more to the heavier breed than to the lighter ones?

DR. TWITCHELL: No. I have been surprised in feeding reduced rations to see how my hens would respond. I am confident I have wasted dollars in feeding. When we are keeping hens on two mills and a half a day, we are not wasting much. For the last few years that I was keeping a few hundred—I am not now—I found that I could keep them for less than that.

QUESTION: Did you say you would feed meat scraps?

DR. TWITCHELL: Yes, with the cooked food. I would feed cooked food in the morning the first thing, cooking it over night if I could do so, and stirring up together the vegetables and meat scraps, and then feed in the morning. I would not feed a large quantity to them, but just enough to warm them up, and then let them be kept busy searching for the whole grain. The very best invigorator is work.

MR. GERRISH: Have you said anything about feeding unthreshed grains?

DR. TWITCHELL: That is valuable. I do not know where you can find anything more so. Mix barley, oats, and wheat together and then feed a small fork full of the unthreshed straw to the hens daily.

If you feed at six o'clock in the morning with the cooked ration then from nine to ten give them a fork full of that feed, and let them work on that until about three or four o'clock in the afternoon, and then rake into the dirt a little corn, you would be giving them about the right quantity of food and the exercise they get will keep them from fattening and in condition to lay eggs. There is much in this, hens that are

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fat cannot lay. Exercise is the best drug to be fed the flocks.

QUESTION: Would you feed ensilage?

DR. TWITCHELL: I have not fed ensilage. Second crop of clover is about as good as anything you can feed. If I was going to store it for winter use, I would store as ensilage.

MR. CONNOR: Don't you think a bedding of leaves would be a pretty good thing, and then throw the grain into that? That would give them as much exercise?

DR. TWITCHELL: Those leaves would get soiled quickly, and very soon become damp. I never like leaves. I used a dry earth, and cleaned out my pens thoroughly twice a week.

MR. THOMPSON: You say you would not use a wooden floor?

DR. TWITCHELL: I would not.

MR. THOMPSON: What would you do for drainage?

DR. TWITCHELL: You might have a little trench dug around outside of the house for surface water.

MR. THOMPSON: Would not the surface become damp, even in that case?

DR. TWITCHELL: No. In the building I have described you are up a foot from the ground. I would put in a foot of stones, and then on this four inches of dirt, which would be kept dry. This makes a valuable fertilizer in the spring.

The matter of rations is a perplexing one. Professor Whitcher has been speaking of it this afternoon with reference to cows. It is just as applicable here as in any other stock. It is for you individually to decided what kind and what quantity you should feed your poultry. Every man must be a law unto himself. As we take the flocks, watch over, care for, and feed them, seeking only their best health,—because that insures the highest state of production,—we shall find that we are all the time reducing the rations and adapting them to the need of the animals. This is the great problem of to-day, to know how, and what to feed.

QUESTION: Would you feed buckwheat?

DR. TWITCHELL: That would be fattening. I would feed that when I came to fatten chickens.

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There is a word that I wish to say in regard to the manner of handling chicks. The common way would be to hatch the broods, letting the pullets and roosters run together with the mother and feeding liberally on corn and other kinds of grain, with the one thought of sending the cockerels to market in good condition and at an early age. Once start the current in that direction it is a very difficult matter to turn it back. The chickens should be separated as soon as you can determine the sexes. Put the young cockerels where they will make rapid growth. When they are ten weeks, twelve weeks, or fourteen weeks old they ought to be ready for the market. A pound of chicken at thirty-five cents, is worth a good deal more to the grower than five pounds at fifteen cents. You want to put these broilers upon the market in the early spring. I think if we made it a rule to sell our male birds before they were four months old, we should find more profit in the business than we do to-day. In the separation of the sexes, we shall also find that the pullets will do better than if allowed to run and fatten with the cockerels. Unless you separate them, giving the pullets a wider, freer range and coarser food, they will mature in advance of the cockerels, fatten, lay a few eggs, and then stop, because they are not in condition for egg building for they have been fed on fattening food.

MR. THOMPSON: Do you believe that the average farmer can use an incubator successfully?

DR. TWITCHELL: That is a question for the man to decide for himself. One will succeed, another fail. One uses only hens and grows ten thousand yearly; another hatches all in a machine. It is simply a problem for the individual to study and decide for himself. Right here we may find the explanation for the success or failure of men in all walks in life. This is only one little path, but it is one where a man must walk erect and in the conscious knowledge of his own powers in order to succeed.

There is no question about the hatching of the chickens in the incubator. The trouble is in taking care of them afterwards.

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There are two or three men in the State of Maine who are carrying a thousand hens each, and are giving special attention to this matter of breeding. In looking over one of these men's accounts the other day I found that his thousand hens had netted him a thousand dollars yearly. That is pretty good compensation for one year's work. Yet there are many who are trying to raise a little of this or that crop upon farms which are hardly fit for anything else except a run for chickens. I have thought, as I came along past these hills, how many places I could see where nothing is growing, but where a man could start a poultry ranch, keep a thousand hens and make a success. Right along with his poultry he could carry his plum trees. You can fence in the orchard and let the chickens run among the trees. The hens and the plum trees will work together admirably. They will be firm friends. The trees shade the ground, and the hens take care of the insects. An experiment was made where a man having an orchard fenced part of it and allowed the hens to run there, while from the remainder they were kept away. The result was that on the part fenced the loss by insects was two per cent, while outside it was sixty, showing that the hens did their work, and did it well. The man who has a plum orchard and intends to realize from it, should keep hens and turn them there, as in that way he will secure a better crop, and protect the trees from insects. It will pay if the hens fail to produce an egg.

In the summer time colonize and get the hens away from their winter quarters. Do this by building portable buildings, the description of which I think you will find in last year's report. Moving these to a new position every two or three days the chickens will return at night, and everything will be sweet and healthy.

There is plenty of room in this poultry business, but do not think of going into it on an extensive scale if you think of doing anything else. It is an exacting business. The hens must be fed from three to five times a day. It does not do to neglect them at all, for, if you do, you lose something every

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time. Do not think of relaxing your diligence a moment. How many men have attempted to start in this business, but failed because they did not continue in well doing. If you go into anything, you want to do the best you can with it and continue to work at it, until, at least, you have assured yourselves that you cannot make a success. The trouble with a good many men who carry on farms is that they try a thing once, and if they don't succeed in that they give it up and try something else; and because they do not realize all they expected to, change again.

This matter of artificial work is something entirely different from the ordinary business of keeping poultry, and it is useless to attempt to combine the two, because no man has time enough to attend to all the details. That is one of the obstacles in the way of success with artificial hatching—the rearing is a difficult matter. Yet, if there is a young man here who wants a good paying business, there is no better opportunity open anywhere on the face of the earth than this business of artificial poultry raising, either with chickens or ducks. Ducks may pay better than chickens, but they call for still closer application in taking care of them. It is my experience that nothing in this world is worth having, unless there is something we have to give in return; and the more we get out of anything, the more we give. It is just so here. The more you make, the more care you will have to take, and the closer the application must be.

You can build the buildings necessary for the hatching and taking care of three thousand chickens and ducks for from one thousand to twelve hundred dollars. Some of the sandy land that will not grow anything else is just the place where you want to do this work, for the soil is warm and dry. A great many men are engaged in this business of duck raising to-day. One intends this year to put on the market ten thousand ducklings, marketing them when nine weeks old. Last year he kept three or four men picking all the season. Those ducklings were grown at a cost to him of five to six cents a pound, and the average price for the season was

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twenty cents. A farmer who was getting five dollars a barrel for his apples, said that he was "making a fair living profit." That man growing ducks is making a fair living profit, and why should not your boys here in New Hampshire be engaged in that business, which is surely profitable, and reclaiming and making valuable these light soils.

One thought I have not yet touched upon, and that is in regard to the dressing. The value of that, of course, depends upon what you feed your poultry. With the hens properly fed, if protected from the wet, the sweepings from the floorings under the roosts removed every two days and put into boxes or barrels, it would be worth about a dollar a barrel. This would be at the rate of forty cents a hen yearly, sufficient to half pay for the expense of keeping, and it is something that should be taken into account in this reckoning of the profits of poultry industry.

I do not know of a man engaged in the business, who has followed it for five years, who is not realizing to-day from a dollar and twenty-five cents to two dollars per hen. Is not this a good business to be entered on and carried forward in some of this light soil? Is there not a good opportunity in the State of New Hampshire, as in the State of Maine, to engage in an industry promising so much? But, says one, how about over-production? Gentlemen, I know of farmers who have been waiting twenty years to engage in a certain line of farm work, and they have not yet been able to decide, and are waiting now, because they were afraid of over-production. Put upon the market an article that is first-class and that can be depended upon, and you need have no fear of over-production.

QUESTION: What do you do for the roup?

DR. TWITCHELL: That is a troublesome thing, and the best way to deal with it is to keep it out, if possible. Keep your fowls clean, and be very careful about those you purchase outside. If any indications of sickness appear remove from the pens at once.

QUESTION: Do you fumigate for it at all?

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DR. TWITCHELL: Yes, during the summer months. I have advocated the colonization of the hens during the summer months. Having done this, I would give the buildings a whitewashing once in two or three months. Then kerosene the roosts until you have killed the vermin.

MR. CURTIS: There is one point that I would like to call your attention to, and that is this: in feeding stock, we find that it is necessary to consider the bulk as well as the amount of nutrition in the food; it is necessary to have the stomach extended to a certain extent in order to have it work well. Is not that true in regard to your chickens? I saw a statement made by a writer on this subject and he said that if you find that you are overfeeding, do not reduce the quantity, but the quality of the food. Feed enough to fill their crops every time, but do not put so much nutrition in.

DR. TWITCHELL: I intended to convey that idea, when I said that we should feed vegetables and clover. Feed the less concentrated food in connection with the more concentrated and thus provide the quantity necessary. My own practice was to feed my hens in little cribs provided for the purpose, intending to put enough food in so that they will eat it readily and go away. You will find that your hens will eat for a few minutes, perhaps five, and then fall back and after remaining a few minutes will come back and eat more. See to it that the first time they go away that crib will be empty. That is what I meant when I said that I could not give the exact ration for a flock, because they vary. Some will take more food than others. In the morning give a mixed ration of cooked oats, corn, and wheat, with vegetables or clover, using about ten per cent of linseed and also about five of meat scraps.

QUESTION: Do you ever cook apples for them?

DR. TWITCHELL: Yes, sir, every thing and anything in the line of vegetables.

QUESTION: Do you prefer them cooked or raw?

DR. TWITCHELL: I would generally cook, although I sometimes would feed vegetables raw, especially cabbages. Cook the vegetables and the clover as a rule, and feed raw as the exception.

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MR. THOMPSON: Sometimes it is asked, what is good for hens when they pick their feathers.

DR. TWITCHELL: I never have had any trouble with that. I never saw it in my flocks during the twenty years or more that I have been breeding. I do not know why, unless it is that they have had a variety of food and plenty of work. It is usually caused by want of something in the food or by idleness.

MR. THOMPSON: I have been told that it was from the want of salt.

DR. TWITCHELL: A very little in the cooked food is good. This trouble may often be caused by want of meat rather than anything else.

QUESTION: Artificial heat would not have the effect of causing them to pick their feathers?

DR. TWITCHELL: I don't think it would. Artificial heat would have the effect of lowering the vitality of the animal.

MR. THOMPSON: Don't you think, as a general rule, we do not use water clean enough?

DR. TWITCHELL: Yes. Always give fresh water three times a day.

QUESTION: Would you feed skimmed milk?

DR. TWITCHELL: Yes, that is valuable. There is no place where skimmed milk will pay better than in feeding chickens, but you would need to take away its equivalent in the grain fed, else there will be trouble. It is food not waste product.

QUESTION: For those who have made a reputation for their eggs and poultry, do you find it easy for them to realize from one dollar and fifty cents to two dollars per hen?

DR. TWITCHELL: Yes, sir, there is no question about that being done. You ought to be able to do it here with good markets all about you. If you have eggs that you can guarantee are not over three days old, you will find parties who will buy them and pay you more than the market price for the sake of having an article that they know is fresh. I know of a man who during the whole year, and for several years, has sold his eggs for thirty-five cents a dozen.

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QUESTION: Will the food affect the quality of your eggs?

DR. TWITCHELL: Yes, just as it will affect the quality of your milk. An egg is made from the food given, it is flavored by the flavors in what the hen eats. This is true everywhere.

QUESTION: In feeding skimmed milk, would you reduce it to a curd?

DR. TWITCHELL: Feed both ways. It is valuable anywhere, though the fresher it is the less the loss in food nutrients. We have but touched this question in the hour assigned us, yet I hope I have been able to inspire a little courage to go out and labor for that higher success which attends more earnest effort. I would that I might have spoken to-day to the young men, or those struggling on these hillside farms finding difficulties at every turn, because the problem of successful poultry culture is especially adapted to them, because without calling for an extended outlay it insures substantial returns. It is a practical every day business and it matters not where one is located there is sure to come a fair measure of profit, while he who saves and utilizes the waste will find his future crops nourished and fertility improving. There is so much in this question, in its bearing upon the fruit problem and these waste lands, that I feel to urge it upon your young men as worthy their careful consideration. Right here on these light soils, by adapting our labors to the conditions prevailing, we may find that larger measure of profit, for which so many have gone long distances only to return empty handed. Instead of stumbling over opportunities at our feet let us seize them, and make of these, stepping-stones to greater prosperity. In doing this the herds and flocks will increase among these granite hills; the problem of to-day will be solved and a generation will arise to call us blessed.

EVENING SESSION.

The meeting was called to order at 7.45. Governor Tuttle, who was on the programme to address the meeting at that time, being absent, Dr. Twitchell was called upon by the president to make a few remarks.

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THE PRESIDENT: I regret very much, ladies and gentlemen, to have to make an apology on account of the Governor not being here this evening. It was understood that he would be present, when the program was made, and we supposed he was to be here until a short time ago. But through some misunderstanding he had made arrangements to attend a meeting at another place and was obliged to do so. We have pressed into service, however, Dr. Twitchell, a gentleman, who, I know, will have something interesting to say.

DR. TWITCHELL.

Mr. President, Ladies and Gentlemen:

This is the first time, I believe, that I ever have had the pleasure of standing in a governor's shoes. At a moment's notice to be forced into service is not pleasant, when I know what you had good reason to expect, I regret that we are not to have the great pleasure of listening to words of counsel from your honored Chief Magistrate, and also that you must listen to me for even a few minutes more.

THE PRESIDENT: It was because you always talk well.

DR. TWITCHELL: This morning I had the pleasure of listening to the worthy master of your State Grange, Brother McDaniel, and this afternoon to questions presented by the director of the New Hampshire Experiment Station, and I have noticed, what I think you must all have seen, that the speakers one and all were aiming at some practical results, striving to give suggestions that would be of benefit to the farmers of New Hampshire.

I do not know just how you are situated here, but if I speak to you a few minutes it must be as I would talk to the farmers in the State of Maine. Agriculture to-day is in a peculiar condition; it is just passing through a critical period, and a combination of circumstances seems to have arisen, placing heavy burdens upon those who are interested in this work in New England. The West has been pouring into our markets its products in such quantities and at such prices as to effectually compete with our Eastern farmers and drive

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our efforts into new channels. Where is relief to be had? Where and how can we find the products by which we can hold our own? This is a question that is staring every intelligent farmer in the face, and it is this we are all trying to solve.

I have one thought in my mind just now, that I would like to touch upon. I believe the present condition of agriculture is very largely due to the education of the past. If your text-books are like ours, you will find that from the primer to the higher English they are all tinged with metropolitan thoughts and ideas, and with hardly an allusion to farm life. The influence of these books is away from the farm. The boys and girls from early boyhood and girlhood have been brought in contact with metropolitan ideas and aspirations, and we have let go one of the most powerful levers by which we might lift the agricultural thought to a higher level. It is no wonder that so many have gone away from the farm home. Again, over and above that, is the fact, that in so many homes they have had drilled into them from Monday morning until Saturday night the hardships of farm life. Fathers and mothers have too often thrown the power of their influence, unconsciously, it is true, but nevertheless against the farm home, and New England is to-day feeling the drain that is continually going on, from the country into the city.

Where is the relief? I think, in the first place, it must be found in the introduction into our schools of text-books which shall turn back this current, in a measure; books which shall show the bright side of nature, and the advantages and pleasures arising from an agricultural occupation. I believe, if we put ourselves to the work, we can find books suitable for this, those emphasizing the importance of natural things, and so leading to a love of the same. In that way we can lead to a better knowledge of agriculture and imbue the young people with a desire to know more and more about it. The subject of agriculture does not need to be mentioned in these text-books. Any child reading a book of this nature would not only be disciplined but also interested. Just at the

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age when what they read makes the greatest impression upon the mind, they would be receiving an object lesson and seeing a new aspect of that life, with which we desire they may be constantly brought in contact. Surely this would be a stepping-stone for something more, and in the right direction.

You are doing a work through your Agricultural college, or seeking to do it; but are you reaching the boys of New Hampshire? I do not know the size of the class under instruction at that college, but I understand that it is very small. Somehow the boys seem to feel, as soon as they set out to get an education, that it must be in some other lines. We want to inspire them with a desire to go to the Agricultural college, there to be prepared to go out and demonstrate upon the farms the instructions they have received. How shall we do it? It seems to me that we have got to begin down at the foundation, and, through influencing their young minds, interest them in the life of these natural things which lead directly towards agriculture. By doing that, as they grow up to manhood, they will naturally turn to the Agricultural college for instruction in special lines.

Here is work for us to do, for it is of the highest importance that we should devise some means by which we can prevail upon our young men to stay at home on the farm. Men say there is no profit in agriculture. How do they know that? Who can stand and say, I know that there is no profit in agriculture? The fact is we have not managed this, it seems to me, as a business. We have lived upon the farm and gathered there our subsistance, but we do not, as a rule, set about it in a manner whereby we can fully measure the results constantly flowing in. When we conduct it on business principles, it will be more easy to keep the boys at home.

I speak of this subject, because it is one that is in my mind continually. When I see the boys in my own State driven from home by the teaching as well as the example of so many parents, and finding, as they too often do, only disappointment in the work they enter upon in the city, I wish

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something might be done to show them the advantages of the farm and farm life. When I read the story, upon the pages of the reports of the Board of Agriculture, of the number of farms which have been deserted, it seems as though there was work for us to do and that it needed to be done at once. These farms can be made a source of revenue. These farms can be made to yield a livelihood to the farmer. There are young men looking about them for some means of subsistance, for a business in which to cast all their energies. We should show them that there is something besides hard work for the man that enters upon the work of a farm. The man who enters upon that work will be lifted up continually in his thought and manhood because of the agents operating around him. The mysteries that crowd in upon him on every hand give food for thought. Because we have not looked after these as we should; because we have not come into the knowledge of nature's mysteries, as we ought, — we have found agriculture wanting one of her greatest compensations.

If the same conditions prevail here as prevail in the State of Maine, and I presume they do, here is something to which our attention may well be given — this matter of educating the young. We should use the knowledge and the influence we have, to help stimulate an interest on the part of our boys and girls in farm life and in agriculture. Doing this, I believe we shall find in the end a sure compensation resulting from our faithful labor.

Mr. Prescott, of Deerfield: Mr. President, I do not wish to dispute this gentleman's honesty, especially since he comes from the neighboring State of Maine, for they are all honest people down there; but I would like to inquire of him if he has any boys of his own, and if he has brought them up in the way that he has laid out for us. Did he desire to make them all farmers and keep them at home on the farm?

Dr. Twitchell: You cannot make a boy what you may wish him to be, nor can you change his natural inclinations.

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Some boys are by nature fitted for certain lines of work, others, for other lines. Thus it will ever be, and boys from the farm home will, many of them, go out into the professions and into mercantile life, into one field or another. Very many there are whom you knew as boys in New Hampshire, who have gone to the cities and have there made their mark. Their power is felt to-day. They have gone from the farm homes of New Hampshire, and of all New England, and it has been the influence of these homes which has enabled them to be the men they are. It would not be possible, nor would I wish it, that all of our boys should become farmers. But we should seek to make farm life attractive by presenting the bright side to the young, and so leading those who would naturally take to agriculture to remain upon our farms. There are farm homes in the State of New Hampshire where you could not drive the boys away, simply because their fathers have been farmers in earnest and have kept constantly before them that brighter side, by which the compensations have been made real to their lives. Prove to the young man by your teaching and example that here he can win success, and you will hold to these New Hampshire homes; plant but a single doubt, and you destroy all hope. Get out of the shadows of negative work and let your influence be positive, and blessings will come to all.

Prof. W. H. Brewer of New Haven was then introduced, and addressed the meeting upon the subject of "The American Trotting-Horse."

THE AMERICAN TROTTING-HORSE.

BY PROF. WILLIAM H. BREWER, NEW HAVEN, CONN.

The story of the creation and development of the American Trotting-Horse is an instructive one. I have chosen it as a title to this evening's lecture, and will use it to illustrate the broader principles of breeding live stock for profit.

One phase in the revival which will occur on New England farms, and which I believe to be at hand, will be the produc-

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tion of better animals as well as more of them. Therefore, I think it desirable to keep the subject of live stock production before our eyes and minds at all our agricultural meetings.

For nearly two centuries, New England bred horses enough for her own use and during a part of that time for a profitable export. Of late years she has been a great consumer of horses grown elsewhere. When she supplied her own wants, the old ideas pertaining to breeding prevailed, there was no science of breeding, the art was very crude, and there were few or no high-bred animals in the country. That was the condition of animal production when the great West was opened up to settlement. Under such conditions the fertile prairies had an enormous advantage over us, but still, horse breeding and sheep breeding for a long time held their own here, only to succumb by the long-continued and more intense competition which was stimulated by the rapid extension of railroads.

But matters have now changed, both as to the status of the competition and the kind of animals the markets call for. The recent advances in science have thrown light on the problems of the stock farm; there is now a science as well as an art of breeding. Under it, the art has advanced greatly and new factors are introduced into the economical problem. Hereafter, I believe that we can compete with the West on more nearly equal terms. Personally, I have no doubt whatever but that the growing of live stock will greatly increase in this State in the future, and under a new regime be again profitable.

Formerly farmers and graziers had a saying that "feed is more than breed," now we know that breed is more than feed; hence, in the future farmers and stock growers must make more account of the differences between good and poor animals than they formerly did. The farmer of to-day sees the applications of science used more obviously in the production of better crops. I wish to impress upon you that science can be equally well applied in the production of better animals. Practical and successful breeding is an art, a high art at that;

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but nature works in accordance with definite laws. and there is a science of breeding, which in its way may be as profitably studied by the breeder as agricultural chemistry is by those who till the soil and grow crops.

I have taken the trotter as a sort of text, not because I think many of you will therefore go into the breeding of fast horses, but because the story is a good one to illustrate several points which I think we need to consider. It is instructive in several ways, although much of it will not be new to you.

The American Trotter is a modern breed, created for the new uses that arose incident to the progress of modern civilization. Our ancestors did not have fast trotters, they did not want them, they did not need them. Why they did not want them and consequently did not sooner have them; why this breed has been created; what it has been made out of; the natural laws that have been involved in the establishment and improvement of the breed; and the applications of the same laws to the breeding other domestic animals, — is the story I have to tell.

I do not purpose to discuss the special blood or pedigree of any one famous trotter or any one strain of blood, however noted. That matter is the subject of an abundant literature, and to be of any use in practical breeding needs to be studied closer than is possible in a popular lecture. My aim is rather to describe the causes and influences that led to the production of this new breed, the methods of improvement, the striking results, and the obvious applications.

The domestic horse is an essential factor in our civilization. What kind of a civilization mankind might have reached without horses I do not know, but I do know that it would be very unlike the civilization we actually have. The higher the civilization and the culture of any people, the greater the variety of uses to which horses are applied, and new breeds are developed as new uses arise. The American trotter has come into existence because of new demands and new wants. Better roads, new styles of carriages, new methods of doing business, railroads, telegraphs, new fashions, and new social sentiments have each and all played a prom-

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inent part in its production. To do without it longer would have been to check the progress of an advancing civilization.

Horses were unknown at the dawn of history. They are first recorded in Egypt, but there, as in Assyria and among the ancient Hebrews, they appear after the other useful domestic animals. The ox, ass, sheep, and camel are spoken of in the Old Testament Scriptures long before the horse. The Hebrews did not use horses to any extent until Solomon's time, and it was three hundred years after that before the Greeks used cavalry.

The horse of the ancients was a small animal. There are numerous representations of him in Egyptian, Assyrian, Grecian, and other sculptures and writings, so we know pretty well what he was like. A small but hardy beast, like our larger ponies, probably rarely more than fourteen hands high.

Quadrupeds have many gaits or styles of motion, but no other species has so many natural gaits as the horse. The fast gait of the horses of antiquity and indeed of all the species of that genus was the gallop or run. That continued to be the case until well into the present century. They were taught various gaits, but the fast gait was always the gallop or run. For many years I have studied the attitudes of all the ancient horses I have seen represented on statuary, bas-reliefs, coins, medallions, and pictures; and if in motion, they are always walking, galloping, prancing, or pacing; rarely, if ever, trotting.

It is a question whether horses were first used by civilized people for riding or driving. The oldest representations of them show them before chariots; but however that may be, so soon as their use became common they were chiefly used for riding; and when we remember that the ancients rode without stirrups, we need not wonder that they despised a trotter and preferred a broad-backed, well-rounded, galloping animal.

The horse of art, from the earliest Egyptian and Assyrian sculptures down to the present century, was not a swift horse of the type of either the modern runner or trotter. How-

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ever much the animals differed, those most prized, as a whole, were strong rather than swift beasts, with heavy necks, broad chests, and the well-rounded buttocks we are all familiar with in the horses of art all down the ages. This is the horse which most artists still like to put in pictures or statues, but which we see in actual use chiefly hauling the dray or in heavy teaming. In that most popular of horse pictures, found in so many homes in the land, representing "Sheridan's Ride," doubtless drawn by an admirer of Greek art, we see the gallant general mounted on a small, chubby-headed, apple-buttocked cart-horse, which he has urged into a frightened gallop, and temporarily going at a rate that would cause him to drop panting before he was the half of the "twenty miles away."

The horse is especially susceptible to the influence of surrounding conditions. When horses become wild and live without the care of man, by natural selection they develop into local native breeds; as instance, the wild horses of South America, the mustangs of Mexico, the wild ponies of the Falkland Islands, and numerous other examples that might be cited. In domestication, surrounded by the various conditions which the artificial life imposes, the species is still more plastic; and in obedience to the varied wants, uses, fashions, and sentiments of society, new types are molded into shape by artificial selection, until there is a vast number of breeds in existence differing from each other more widely than do the breeds of any other domestic species except dogs. The heaviest draft-horses are ten and even twenty times as heavy as the lightest ponies are, and the breeds differ in their endurance, temper, and instincts as much as they do in size and form. Nearly every region has breeds or sub-breeds of its own, the special characteristics of which are in part owing to climate, soil, food, drink, or other local conditions, and in part to man's directing care and his selection for particular qualities.

In the hands of the breeder, the species is especially plastic and is readily molded into new forms and new breeds. As

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the needs of society change, new uses and new breeds of horses are developed to meet the new demand; or as fashions change, old breeds are modified to suit the changed tastes. New breeds are molded or old ones altered to fit new fashions as truly as clothes are, it simply takes a longer time. The breed of race-horses, known as the English thoroughbred, was developed especially for racing. It was created as an implement of sport for an aristocratic class, and for royalty itself. It became also an implement of gambling, and under the incentive of great possible winnings the breed has been gradually developed to its utmost limits of speed, until now it is not only the fleetest on the race-course, but probably the breed is practically finished, and we cannot hope to see its speed materially improved.

The American trotter is a new breed in process of development, now coming into existence to meet new needs in society and new fashions in sport. It is now being molded into shape by an interesting combination of influences, partly for new uses and partly because of new social sentiments.

To trot fast has not, heretofore, been natural to horses. We are in the act of making a breed in which it is the natural fast gait, and the next century will see a breed of trotters with two-minute horses as common as one-minute forty-second runners now are. The breed is in process of evolution, in obedience to definite laws, to meet wants imposed by the new phases of our modern civilization.

Although used for a great variety of purposes, down to this century the horse has had its greatest value as an implement of war and of ceremony. All other uses were subordinate to these. For these uses he was probably brought into Egypt; for these, Solomon imported horses in his day, as Greece, and Spain, and England, and many other countries have later; for these uses there are government establishments for breeding and improving horses still maintained in most European countries.

For more than two thousand years (and that represents a vast number of generations of horses) the most ostensible

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use was for war, and until artillery came into use and baggage-wagon trains accompanied armies, the war-horse was essentially a horse for riding or a pack-horse. Neither of these could be a fast trotter.

If for riding, a variety of gaits was very desirable, and many artificial gaits were taught. In the Middle Ages this came to its height, and not only ambling, pacing, and racking were taught, but many others, the very names of which are now forgotten except as they exist in the literature of the times.

This variety of gaits is a most desirable quality in a riding-horse. A change of gait is a great relief to the rider and probably to the horse also. Any one who has had to ride by the hundred leagues on a stretch knows what a relief a change of gait is. With both riding and pack animals I can speak from personal experience, having ridden horse or mule some twelve or fourteen thousand miles in Western explorations. I have worked with pack-trains for hundreds of leagues on a stretch and among the highest of the Rocky Mountains and the Sierra Nevada. Three times I have taken my pack-train beyond even the trails of wild animals to above twelve thousand feet elevation amid the rocks and eternal snows in the trackless desolation of such altitudes. I know of the merits of a riding-horse and of the pack-horse, and for both of these uses the modern trotter is eminently unsuited.

The type or character of the horse population in any community depends, partly on the uses required of the horses, partly upon the habits and customs of the community, and partly upon the fashions set by the higher classes of society. The trotter is essentially a horse to drive, and so long as the chief uses of horses were for riding or carrying a pack, the fast trotter would not be produced nor trotting encouraged, although pacing might be, and actually was.

The horse of war and travel remained for ages essentially a riding-horse. For this certain Oriental breeds, the Persian, Arabian, Turkish, and the Barb, have been noted from

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ancient times, and their blood is an ingredient in various modern breeds, the original still constituting, perhaps, the best riding horses in the world. They had the form, strength, endurance, and gait, to eminently qualify them for this; and the instincts to fit them for the companionship of man in the camp and on the march. Between the driver sitting in a wagon and the beast which hauls him along the road, there can be no such companionship and sympathy as between the rider and his horse. Horse and rider are in much closer sympathy. Each feels the every motion of the other; each knows the other's thought; the two seem as but one creature with a single brain and a single purpose. The centaur is a creature of the poet's imagination, but it comes very near a reality.

What an important role the riding-horse has played in the history of mankind can only be appreciated by a study of horses along with that of nations. The Chinese civilization is essentially without horses, no wonder that it never spread far from the basin of its two rivers. So too with the civilizations of India and Japan and all the Buddhist civilizations. Dense populations grew, but they did not use horses to any considerable extent, and without the proper aid of horses, they have lagged behind in the world's progress. Take, on the other hand, the history of Mohammedanism. Mohammed and his followers swept wherever the Arabian horse could carry his armed rider and no further. Other peoples had pushed their conquests by sea as well as by land; but by the horse, and on the horse, the Mohammedan conquests were made; the horse was the real standard-bearer of the crescent, and where the Oriental war-horse was stopped the spread of Mohammedanism was stayed.

The Moors invaded Spain on their Barb horses, and, when they were driven back after several centuries of occupation, it was the men and Mohammedanism that were driven out. The blood of their horses remained, and made the Spanish horses the most noted of Europe, and the part they played in the wars of the times is the theme of many a Spanish ballad.

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When the Spanish horse was at its best, then Spain was at her height among nations; and as her horses declined, her national glory waned.

The Spanish adventurers brought their horses to America, and the part they played in the conquest of Peru and Mexico forms one of the most picturesque features of those cruel days. Those Spanish horses were the progenitors of the wild and half wild breeds, which later spread from Patagonia on the south, to the West Indies on the east, and Texas and California on the north. The native Californian horses of thirty years ago showed traces of their Barb origin, notwithstanding all the vicissitudes of fortune they had been subjected to, and, of their riding qualities, I have a vivid recollection of some thousands of miles upon them.

The Indians of the West derived their horses from this stock. Before that, dogs were their only beasts of burden, with which they followed the buffalo in its migrations. The old Catholic Fathers have recorded what feeble people the Indians of the plains then were. Volney, an educated Frenchman, who made a trip in the far West in 1795 to 1798, has told us what they were even then. He compared our Western plains to those of Tartary, which he had also visited, and says, "the likeness would be completed could we see its natives metamorphosed into horsemen," and adds that "this transformation has begun to take place within the last twenty-five or thirty years," that the Sioux were beginning to be mounted on Spanish horses derived from Mexico, and he prophesies that "in half a century more these new Tartars will probably become formidable neighbors, and the settlers beyond the Mississippi will encounter difficulties totally unknown to their ancestors." We know, all too well, how this prediction has been fulfilled. With only dogs as beasts of burden, the tribes were feeble and little to be feared; but with horses, they became a new people —the Arabs of America, the most formidable foe that European civilization has met with in its western march.

The Spanish horses were carried to England to improve her breed of war-horses, and were an important element in the

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rise of British power. And they went to Italy and Germany and Holland and France; and wherever they went they helped increase national wealth and national strength.

Remember that all this is about a horse to ride; a horse which when in no hurry would walk, or on the march could trot, amble, rack, or canter, to relieve his own or his rider's tired muscles, or on the run sweep down on the place of the enemy like a whirlwind, and then retreat as swiftly should that be necessary.

Only a running-horse is fit for such work. Try to imagine an Indian raid or an Arab foray on trotting-horses; the very idea strikes one as ludicrous.

Over all Europe the want was essentially the same. With the use of heavy armor in the Middle Ages, a heavier animal was needed; yet he was a charger, a prancing, galloping steed. Imagine a crusader of old, clad in steel, rattling to the combat on a trotter; the suggestion provokes merriment. Even in later times, after armor was discarded, a galloping horse was needed for cavalry; try to imagine the impetuous charge at Balaklava, on trotters.

When artillery and wagon-trains became a part of armies, the want was essentially the same; the heavy horse of the dragoon was fit for the gun-carriage or the baggage-wagon.

The war-horse was a running-horse, and it was the war-horse that stood as the representative of his species from the days when Job's horse snuffed the battle from afar; down through the days of Greek, Persian, and Roman history; down through the Middle Ages; the Thirty Years' War; the wars of Napoleon; and indeed until the present generation, when the locomotive began to draw armies to the battle field. The horse for war, a running-horse, is still the favorite in all those countries where the road to greatness lies through war and conquest. To produce the trotter, it needed a country wooing the arts of peace and seeking greatness by industry and annexation, rather than by plunder and conquest. It was fit that the breed should originate here, no other country developed the needs as we did.

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In times of peace, the horse has figured in social ceremonies and as an index of rank, and with the rich, as an implement of sport and a gratification of luxury. In agriculture and as a common beast of draft, he has played but a minor part until within the present century. His improvement for use in peaceful industry received but very slight attention until within a hundred years.

Fashion and sentiments in society have always been an important factor in producing new breeds or improving old breeds of horses. From the time when an ordinary Roman citizen was forbidden to use white horses (and doubtless much earlier than this) there has been a social factor entering into every problem of horse raising. What colored horses might be used by persons of this rank, and of that; who might hunt on horseback, and who might do it only on foot; indeed who might ride at all, and who not, have been the subject of numerous laws for centuries and still exist in some lands.

In all ages the use or possession of the horse has been, in one way or another, an emblem of social position, with pagan, Mohammedan, Jew, and Christian alike. Even now, and in this free country, a carriage and horses means more than the convenience of getting about. I say "carriage and horses," not "horse," for there is a social sentiment, a tradition of the Old World, that to be driven behind two horses is more respectable than to drive behind one. I am acquainted with good Christian people, who can ride to the store or to market behind one horse on week days, but on Sundays they feel that their social position requires them to worship with two horses. We see an evidence of this sentiment regarding the dignity of a span, as contrasted with a single animal, in the use of the phrase "one-horse affair," applied to anything contemptibly small. It has never been "the fashion" to "drive" behind one horse, in England or on the continent of Europe, and it is not to this day, although the necessities of city street travel require many one-horse vehicles.

Fast trotters could never be developed until we had a class of influential people of recognized social standing, with whom

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it was *fashionable* to drive one horse before a light carriage. That class arose in this country; it does not exist even yet in most other countries. The trotter is so fashionable here that it is difficult for us to appreciate the sentiment in the Old World regarding the use of single horses before private carriages. They are common enough for hire in the cities, and among the common people, the butcher's cart and grocer's wagon has but a single horse there as here, but for private driving among persons of recognized social position, only a span will do. When Lord Brougham devised a one-horse vehicle to carry him to and from the railway station or for his private business about the city, the fact, that a distinguished lord should condescend to drive behind a single horse, caused much and pointed comment. The comic papers ridiculed him, the name "Brougham" was given to the vehicle, and it was long before the gentry took kindly to it.

The trotter is pre-eminently a roadster for light draft. He is the beast to be driven single, and could not be developed until there should arise a fashionable demand for such an animal. His value as a mere horse of use was not enough to lead to the formation of the breed; there had to be some other sentiment than mere use to stimulate the creation of a new breed. As matters were, merely a "good kind of animal" was not enough to create a new breed or even preserve a strain, no matter how useful it was. The Morgan horse of New England has become practically extinct and the Norfolk horse of Old England became nearly so.

The fact, that trotters were unfashionable, was the chief reason why they were not bred. I have carefully read a great amount of old literature relating to horses, and nowhere do I find a good word for trotters in the Old World, if I except perhaps Lawrence, who wrote the last years of the last century. He foresaw their use as roadsters. From time to time they are mentioned as mere roadsters, only valuable for a vehicle.

In most of the old horse literature a trotter is spoken of with disfavor. Fast trotters were, of course, unknown. An

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old French ballad "Le lai du Trot" tells us that those ladies who are kind to their husbands in this world may ride on beautiful, ambling palfreys in the next, but those women who are cross and ugly to their husbands here must ride on trotting nags in the life to come; such was the estimation in which trotters were held.

With the American Revolution, a new nation with new social and political sentiments came into existence. In the Old World and during colonial days horse-racing had been, and was still, an aristocratic sport, not to be indulged in by the masses because of its expense, nor by the religious because of its gambling immoralities, nor by the thrifty because of its uncertainties. With New England Puritan, Rhode Island Baptist, New York Dutch, and Pennsylvania Quaker alike, horse-racing long remained unpopular. It was very unthrifty to say the least, if not indeed immoral.

From the traditions of colonial days and the devastations caused by the long war for Independence, it was very natural that a sentiment against horse-racing should be held by the thrifty portion of the citizens of the new republic. As the times grew better after the war and wealth increased, there was a rapidly increasing taste for horse-racing, but the gambling and extravagance incident to it soon led to the passage of laws against it. These attempted the absolute repression of an evil rather than the regulation of a legitimate sport. Before 1820 laws had been passed in all the states north of Maryland forbidding horse-racing in every form, under very severe penalties.

At that time, as well as before, horses were more generally owned by the masses of the people here than in any country of Western Europe. Horses were so common and so abundant that their possession conferred no social distinction whatever. They had, of course, their money value, but they had no more social signification than other property had. One-horse vehicles of one kind or another were in use and were not under the social ban they were in England. What kind of vehicles were used, where they were used, what they were

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used for, and who used them, depended upon the roads and convenience. Wealthy people might consider a span more dignified than a single animal, but the use of a single animal to drive was in no way socially degrading. Where it was convenient to use a horse there was no disgrace in driving it single. One-horse vehicles being respectable as well as convenient came to be very widely used by a class who would not have so used them in England. The "one-hoss-shay" of earlier times gave way to the better light wagons, and as the roads gradually became better the light wagons were improved, and finally the buggy was devised. This eminently useful vehicle is a purely American invention, succeeding the ruder light wagon or one-horse wagon. The buggy, a light one-horse wagon, with steel springs, came into use between 1830 and 1840. At the former date buggies were practically unknown, at the latter they were sufficiently common to be no longer regarded with curiosity. They then rapidly came into use and played an essential part in the development of the trotter.

The twenty years preceding this last date marked an era in the breeding of trotters. At its beginning, in 1820, there were no records below three minutes. This was probably about the limit of the natural trot without special training, and was reached by but very few of the very best horses. Alleged performances in three minutes or a little less had been described from time to time, for twenty or thirty years before, as occurring at various places; but the lowest record for a stake or wager was three minutes and there was but one such which still stands as a "record." It was three years after the close of these two decades that the first record was made in two thirty, yet these twenty years were such important ones in the story I am telling that they marked an era in the history of the breed.

It was during that period (1820 to 1840) that speed at the trot as a leading point of excellence came to be especially bred for; trotting became an established sport, tracks for the training and testing of trotters were established under specific

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legislative enactments, buggies came into use, and driving fast trotters on the road for pleasure became fashionable. This was the period which marked the beginning of the trotter as a breed, although sentiments in society and blood in horses were preparing for it long before. So let us for a moment look back again.

I have said that trotters were not in favor, but there is a sense in which at times they had friends and were advocated. The trotters of those earlier days were not, however, fast, but animals for slower use. We find occasional allusions to them in English history from time to time from very early dates. In a letter of Margaret Paston to her husband, about 1465, she tells of buying "three horses at Saint Faith's fair, and all be trotters, right fair horses. God save them and be they well keeped." We have frequent glimpses of both trotters and pacers in Norfolk. We have these Norfolk horses especially mentioned as early as 1477, and several pages might be filled with such history. In the attempts to increase the size of the common horses of England, trotting horses are mentioned. A sumptuary law of Henry VIII, sometime before 1540, provided for the raising of trotting horses for the saddle. He started the rearing of heavy horses, the probable progenitors of the England draft-horse of to-day, in fact, he appears to have originated the name shire-horses for them.

During Elizabeth's reign, the production of these heavy animals was further encouraged. Blundevile, in his famous "Fower Chiefest Offices belonging to Horsmanshippe," (1565) says that some "would have a brede of Greate Trottinge Horses, mete for the War and to serve in the Field," but he considered them secondary to the lighter running horses, which were better for a gallant cavalier to ride.

We hear of trotting-horses, pacing-horses, racking-horses, and ambling-horses in Norfolk for more than four hundred years. Small, easy, ambling horses for ladies' use were called hobby-horses down to the latter part of the last century. The Norfolk "trotters" were mentioned by many writers,

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and the breed is being revived again and improved, and has now its stud-book.

Towards the last part of the last century trotters everywhere began to attract more attention, and we have numbers of accounts of horses that could trot a mile in about three minutes. There appears to have been a somewhat simultaneous movement in various countries. We hear of it in Italy, France, Germany, and Russia, as well as in the United States. Trotting courses were talked about in both Italy and France, if not actually started, and there were trotting matches in England also. They were not fashionable, however, in any of those countries, and early in this century the interest in trotting declined, and, finally, died out all over Western Europe. It survived only on the estates of Count Orloff in Russia, and in parts of the United States.

Inasmuch as roadsters—"hackneys," as they were called in England—were increasing in importance as the roads were being improved, it is not easy, at this distance in time, to see why the interest in trotting should have so completely died out in Western Europe. I strongly suspect that both the rise and the decline was in some way related to the political events that took place in the fifty years between 1775 and 1825.

But whatever the causes of the decline there, they did not prevail in this country. Trotting stallions were advertised, both here and in England, during the latter part of the last century. An advertisement in the "Connecticut Journal," April 30, 1788, of a stallion called Game Leg at the stable of William Fowler in North Guilford, describes him as being of a bright chestnut color, and "supposed to be the swiftest trotter in Guilford." So far as I know, this is the earliest advertisement of a distinctively trotting stallion in this country. But New England was then, and for many years later, exporting horses to the West Indies, and I notice in the advertisements of the shippers that trotters are often especially asked for.

All of this call for trotters was, however, for horses of

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common use and not for fast trotters in the sense used to-day. While there were occasional trotting matches, they were practiced as a sort of rural and plebeian pastime rather than as a fashionable sport. As it rose to the dignity of a sport, it was one suited to the tastes and the means of the masses, for all owned horses, and this was a sport in which even plow horses could take part.

Such was the condition of trotting for the forty or fifty years previous to 1820. In 1806, Volunteer (whose grandsire was Trotting Jalop) was reputed to have trotted a mile in England in two minutes fifty-eight seconds. An item in the "Connecticut Journal" of June 19 of the same year says that a few days before, the horse Yankey from New Haven, had trotted at the Haarlem course, a mile in 2.59. An English paper in October, 1810, tells of "a chestnut horse from Boston" trotting a mile in 2.58½. The "New York Museum" of July 15, 1815, tells of trotting for sweepstakes at Flatbursh on Long Island. From the number of such items, it is evident that trotting was occasionally indulged in, — sometimes in England, but more often in this country. There were fewer trotters in New England than in the Middle States, although trotters, such as they were, were as much bred, and there are numerous traditions of brushes on the road.

The desirability of having a class of trotting roadsters for light wagons was so widely felt that, as has already been said, they were bred for, unsystematically however, for thirty, forty, or even more years before systematic breeding had materially increased the speed of trotters, it rather favored the production of horses that would trot willingly, and in this country the taste for this gait grew and spread during the very period when it was declining in Europe.

This taste or sentiment naturally led to and stimulated the unregulated trotting alluded to, but this as well as actual racing was specifically under the ban of the law in some of the States and inferentially so over the whole region where the love of trotting was strongest. The desirability of improving the trotting roadsters was so obvious that it was made the

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excuse for amending the laws so as to legalize trotting. This was not, at first, the re-instatement of wicked "horse-racing" on "race-courses," but rather, the allowing under suitable restrictions of the more moral "trials of speed" on "tracks" for the training of roadsters. The test of speed could be made with a single horse and a watch even better than with several horses in a "race," and thus records naturally and legitimately came into use.

The state law of New York passed in 1802, forbidding all horse-racing and trotting, was amended in 1821, removing for five years the penalties against horse-racing on certain tracks and under specified conditions, and allowing "the training, pacing, trotting, and running of horses" upon certain regulated courses in Queen's county on Long Island. The act provided that the Sheriff of the county should be present at these "trials of speed" — as the statute calls them — to see that they were conducted decently and in order, and the meetings were allowed only on certain days in May and October. When this amendment expired by limitation, it was re-enacted April 3, 1826, extending the privilege for ten years and until March 30, 1837. Before this expired, another amendment in 1834, allowed "the trials of speed authorized by law in the county of Queen's" to take place at certain other dates than May and October.

The organizations controlling these tracks on Long Island were the beginning of special organizations for the improvement of trotting. Although the legal provisions of these amended laws nominally extended to pacers and running-horses as well, the real object was for trotting.

The New York Trotting Club was organized in 1825 with the aim of "improving the speed of road horses," as the racing clubs and jockey clubs of England had been a century earlier to improve the breed of riding horses, and just as those earlier sporting clubs created a new breed of horses, which became the swiftest runners of the world, so these later ones have created another new breed, which have now become the swiftest trotters in the world. The track of the New York

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Trotting Club, near Jamaica on Long Island about a mile from the old Union course, was the first trotting course in America, and probably the first in the world. The Hunting Park Association was formed at Philadelphia in February 1828, and the next year measures were begun for a trotting club at Baltimore, and from this time similar organizations spread rapidly. The "American Turf Register" began in 1829 and recorded the trots, and by 1830 trotting had become an established sport, rapidly increasing in popularity.

There was for a long time a sentiment with many sporting men that trotting was a sort of rustic sport, fit only for the masses, but the fact, that it created such an interest among the masses, was a great gain in the end. In the creation and development of a new breed of horses, it is essential that the interest be sufficiently wide-spread to materially affect the market, and the aim must be sufficiently definite to specialize the points in breeding. The growing popularity of the sport supplied these factors. It was the track, and the gambling incident to it, that supplied the incentive for breeding faster trotters and specialized the point to breed to, rather than for use as roadsters, although this latter was the ostensible reason hung out on the sign, and which appealed to the more moral portion of the public.

During the period I am now more especially discussing (1820 to 1840), trotting became an established sport, legal obstacles for public trotting were removed, organizations for the improvement of trotters came into existence, buggies came into use, trotters driven single became fashionable for pleasure-driving, fast trotters were especially bred, trotting pedigrees began to be studied, the foundations of the breed were laid and the speed greatly improved, although, as yet, no 2.30 horse had appeared on the scene.

By the close of this period, many horses had become well known to the public as trotters, many of the names as plebeian as the sport was held to be. We hear of Betsey Baker, Bowery Boy, Bull Calf, Burster, Ephraim Smooth, Jerry, Jersey Kate, Paul Pry, Rattler, Rob Roy, Sally Miller,

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Screwdriver, Top Gallant, Whalebone, and a score of others, now this one to the front and then that. Top Gallant (foaled about 1806) was perhaps the most popular horse of his day. He does not appear to have won much nor often, yet he preserved his popularity for all of that, and his best time, 2.40 (although not a "record," and beaten the same year by the Treadwell Mare), was the slang phrase for speed for thirty years after. He lived to a good old age, as so many trotters have since done, and it was claimed that when nineteen years old he could still trot in 2.45 with a man weighing 150 pounds on his back. In 1832 Burster trotted in 2.32, and then became affectionately known as "Old Buster." Next came Edwin Forrest, who lowered the technical record to 2.31½ on the Centerville course, L. I., May 9, 1834, but even this was a saddle record. This track was too long; if allowance be made for this, the time for an actual mile was nearly a second better; but as it was, it took nine years more to beat it, when Lady Suffolk lowered the harness record to below 2.30.

From that time on all the influences have been at work necessary for the specialization and development of a new breed, and this is the only case among all our domestic animals where we have the exact data all along by which to trace the rate of progress, and to see what the actual improvement has been. This is furnished by the "records" and by recorded times which are not the technical records. The "record" is the time made by the winner in any contest for a purse, premium, prize, stake, or wager on any course and in the presence of a judge or judges. The records of trotting have been preserved with very great care, during the whole development of the breed. Nowadays, the records are those in harness unless otherwise specially stated.

As I have already stated, about three minutes, or a trifle better, I believe to be the ultimate limit of speed in the best trotting-horses without special training, before the creation of special trotting breeds. John Lawrence, a lover of trotters in his day, in his "Practical Treatise on Horses" (1796) says that "the utmost speed of an English trotter (and I have

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reason to believe that they excel all others) is a mile in about two minutes fifty-seven seconds." He cites cases where the speed was from this time to three minutes. Previous to 1818 there are many alleged times of three minutes or a little less. That of Yankey has been already alluded to and Shales trotted three times in England in that time. It seems to me that there is abundant evidence that a number of the best trotters had reached that speed, and that, until systematic breeding began for fast trotters, none were essentially faster.

Trotting as a sport may be said to have begun in 1818, when it was still considered a question with most horsemen whether any horse could trot so fast as a mile in three minutes. Frank Forrester tells us that the now famous trot of 1818 grew out of a discussion at a jockey club on that very point. Col. Bond of Maryland doubted if any horse could trot so fast as that, while Maj. Jones, of Long Island, thought otherwise, and it resulted in a bet, in which Col. Bond bet Major Jones $1,000 that "no horse could be produced that could trot a mile in three minutes." The prevalent sentiment as to possible trotting speed is shown by the statement, that there was much side betting and the odds against the horse were immense. But Boston Blue won and Col. Bond lost the thousand dollars. This trot made much talk at the time, an early account says that this wonderful horse was taken to England and exhibited as an animal which had actually and unquestionably trotted a mile in three minutes. This, notice, was a trot against time, and may be said to be the beginning of technical records. The actual development of the breed may be shown from the records in two ways, — first, by a table showing the successive lowering of the best records; and second, by a table giving the actual numbers of horses with the several records below that made by trotters before this improvement had begun. The following table shows the best times down to 1840, and the best harness records after that. Previous to the date mentioned, all of the best records were under saddle; and there were many well authenticated times observed that would now be ruled out as technical records. Latterly, all

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the best times are records in harness. For the purpose of showing the actual increase in speed, it is fairer to use the best authenticated times for the progress during the earlier period and until we had 2.30 trotters. I have, therefore, in the following table included in the earlier parts authenticated times and saddle records; but since 1840 only technical records in harness, although Lady Suffolk trotted in harness in 2.26½ in 1843 and Tacony in 2.26 in 1852, both of which were better than the best saddle records at those dates.

Table of increasing Speed.

1818.	Boston Blue	3.00
1821.	Top-Gallant	2.43
1824.	Top-Gallant	2.40
1824.	The Treadwell Mare	2.34
1830.	Burster	2.32
1834.	Edwin Forest	2.31½
1845.	Lady Suffolk	2.29½
1849.	Pelham	2.28
1853.	Highland Maid	2.27
1856.	Flora Temple	2.24½
1859.	Flora Temple	2.23½
1859.	Flora Temple	2.22
1859.	Flora Temple	2.21½
1859.	Flora Temple	2.19¾
1865.	Dexter	2.18
1867.	Dexter	2.17¼
1871.	Goldsmith Maid	2.17
1872.	Goldsmith Maid	2.16¾
1874.	Goldsmith Maid	2.15½
1874.	Goldsmith Maid	2.14¾
1874.	Goldsmith Maid	2.14
1878.	Rarus	2.13¼
1879.	St. Julien	2.12¾
1880.	St. Julien	2.11¾
1880.	St. Julien	2.11¼
1880.	Maud S.	2.10¾
1881.	Maud S.	2.10½

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1881.	Maud S.	2.10¼
1884.	Jay Eye See	2.10
1884.	Maud S.	2.09¾
1884.	Maud S.	2.09½
1885.	Maud S.	2.08¾

With much labor I prepared and published seven years ago a table giving the number of horses having the various records below 2.30. The labor of its preparation was so great and the figures have since so enormously increased, that I have not kept up the table to date. I will here only use some of the figures which, taken in connection with the above table, will enhance its significance. This table is very significant and however studied is most instructive. I can here call your attention to only a few of its suggestions.

If we consider the gain by decades beginning with 1818, we find in the first decade, ending with 1828, the time was reduced 26 seconds. This great gain in such a short time, while the previous twenty or twenty-five years had shown none at all, was doubtless due mostly to the better training and preparation of trotters, although partly to the much larger number trotting, and possibly a little to breeding for this gait.

During the next decade, ending with 1838, the speed was increased only two and a half seconds. Mere training had nearly expended its effect in the previous decade, and heredity through a trotting pedigree had not yet time to show any considerable results. No horse reached the 2.30 class, even under saddle for five years later, and not in harness, until seven years later.

During the next decade, ending in 1848, it was lowered but two seconds (4, counting Tacony's time under saddle). We have now a 2.30 class with two or three horses in it, and several others who had made that time under saddle or as parts of longer races.

During the next decade, ending with 1858, the record was lowered five seconds, trotting blood was beginning to tell, and at its close there were about thirty horses in the 2.30

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class, not quite so many with this technical record, but over thirty who had made that actual time.

Ten years later, 1868, the record had dropped seven and a fourth seconds farther. When Flora Temple trotted in less than 2.20, many considered that the limit of speed at trot had been reached. More than one writer, even in the sporting periodicals, considered her a freak of nature, an abnormal production which might never occur again, rather than the logical result of intelligent breeding with a specific aim. Before this decade closed, the best record was 2.17¼, there were already two or three horses in the 2.20 class, and 146 in the 2.30 class.

The next decade, ending in 1878 lowered the record 4 seconds more, and over a thousand horses had trotted in 2.30 or better.

The next ten years lowered it four and a half seconds more, and the 2.30 list then numbered 3,255 horses. At the close of last year, 1890, there were 4,613 horses in the 2.30 list, 382 in the 2.20 list, and two in the 2.10 list.

When we contemplate these figures, the query immediately suggests itself, how fast will horses ultimately trot, and how long will it be before they reach their limit. It is a fascinating subject to speculate on and many have ventured opinions on the matter. It is at best but a guess, although each guesser uses arguments to fortify his opinion; and the conclusions differ all the way from, that the limit is already reached, to the inference, that horses will ultimately trot as fast as they now run.

Some prominent writers and breeders think that the better trotters of to-day have practically reached the limit, and that further improvement will simply result in placing a larger number of horses in the 2.10 or 2.12 class. These persons believe that the two minute trotter is a practical impossibility. My own belief is, that a two minute record will be reached, that many horses will be bred that will trot faster than our best record of to-day, that the limit will not be reached for half a century yet and not until we have a breed in which the

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instinctive fast gait is the trot, as the run is now the instinctive fast gait of the thoroughbred. When after breeding from successive generations of "winning sires" of trotters, with corresponding dams; when the foal trots as instinctively as the thoroughbred now runs; and when the conformation of the animal as completely sustains these instincts as that of the thoroughbred does his, — then we will have many horses in the 2.10 list, and the two minute trotter will be among them. Some enthusiasts believe that the trot will finally be as swift as the run. This I doubt.

Let us notice some more of the lessons the history of the trotter teaches, and which have a general application. The breed had its origin in a mixture of various breeds and of mongrel blood. In all practical breeding two biological forces, heredity and variation, always go along together. Heredity tends to keep the coming generations like the past: variation tends to make them differ. Variation is the uncertain factor in breeding, and yet without it there could be no improvement. It is well known among breeders that the more varied the ancestry, the more varied and variable the descendants. Hence the uncertainty in breeding from mongrels. The original stock from which the trotter was created, the raw material out of which the breed has been made, was a very varied and mixed one, inducing much variation and thus giving the breeder abundant material for skilful selection. The English thoroughbred, the Arabian, the Barb, the Narragansett pacer, the French draft through the Canadian, and the mongrel native stock originating from various unknown importations have all contributed to his blood. From the better animals produced out of this heterogeneous mixture, the trotter has been developed by careful selection and skilful breeding. The variation in the direction of better trotting, whether the instinct to trot or the conformation to produce speed, was taken advantage of; the characters enhanced by selection, and fixed by heredity and pedigree.

I will say in this connection that I think the blood of the pacer in the trotter has been very important and has operated

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in two ways. First, it was good blood, some of it derived from the old Spanish stock, it is said. Second, the natural instinct to run had been more thoroughly broken up in the pacer than in any other kind of horses. Pacing was considered an artificial gait acquired through careful training, which after generations of such special training became more or less instinctive, "natural pacers" being the result. This blood increased the disturbance in the natural instincts, and aided in the variation through which a new instinct was produced. Some writers grow merry over the "trotting instinct" and say that there is no value in it, some even deny that it exists at all. Such denial becomes a mere play upon words, for no one can deny that there are now "natural trotters," and that trotting was not originally a fast gait for any breed of horses.

Pardon this digression, the next suggestion is, that the best material should be used as the foundation to improve upon, whether it is to be used as the foundation of a new breed or of merely a new flock or herd. The most skilful breeder cannot reach as good results from an inferior breed as he can from one of naturally greater excellence. I have often thought that had that great breeder, Bakewell, chosen short-horns to begin with instead of long-horns, the history of improved cattle would have been very different from what it has been, and short-horns would have come into fame and eminence a generation earlier than they did. Although not acquainted with the long-horn breed, yet I have watched its career with great interest. It had the start in time, and in the hands of skilful breeders it has fought for a high place; but has been unable to keep up in the competition with the short-horn breed, which was better to begin with and soon distanced its older rival. Now, after a struggle of more than a century since Bakewell took hold of the breed, it is farther behind in the competition than it was seventy years ago, and must, as a consequence, in time disappear as a competitor in the general markets.

The trotter was created out of a mixture of various blood but

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it was all of it, so far as we know, good blood to begin with, and no further ingredient should now be introduced, unless of the very best. Personally, I do not believe that any considerable further addition of thoroughbred blood is advisable to increase the speed, but I do believe that certain strains of Arab blood may be used with great advantage to increase the value rather than the speed. A prominent New York breeder, Mr. Randolf Huntington, is still using Arabian blood as an element for the production of serviceable animals with much success. I think that, if enough other breeders would think with him, a desirable improvement would be the result. As it is, I expect to see a fleet, beautiful, and serviceable strain of trotters originate from that breeding.

Breeding trotters as an implement of gambling may be objected to by some. All fast trotters are not used for the track, yet it has been the gambling incentive that has made the breed what it is. This incentive has stimulated an enthusiasm which mere sober and practical use never could supply, and has determined the specific points to breed for. It has furnished the incentive to training, has enhanced prices, and has been an essential factor in the practical problem. I will not here discuss the gambling phase, further than to use the practical fact, that it has enormously enhanced the market values of fast trotters and has brought the useful character of all trotters more conspicuously before the public. Over a hundred thousand dollars were paid last year for the trotting stallion, Axtel, and there has been much speculation as to whether as large a sum would ever again be paid for a trotting stallion. Why should it not? If trotting remains the fashionable sport it now is, a stallion as a "winning sire" may justify such prices as a simple investment. Such possible inducements and possible prices for very fast trotters for use as implements of gambling, have been an essential factor in making the American trotter what it is, and will continue to be a factor in the development of the fastest members of the breed. That some trotters are used as implements of gambling is no more an argument against breeding them, than it would be to discourage

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the growing of wheat, pork, or cotton because of the gambling of the produce exchange.

While similar incentives do not exist in breeding the useful kinds of other live stock, the breeders can nevertheless profit by the lessons the breeding of racers and trotters teaches and the principles they illustrate. It shows what can be done if sufficient care and thought be used.

In the revival of agriculture in New England, which I believe to be at hand, I think that horse breeding for city markets will again revive. There is now and will continue to be a steady market right at home for the many kinds of serviceable horses needed in cities. For most of these uses some trotting blood is an element with a money value. "Trotting is the gait of traction" has often been enunciated, the gait for a vast multitude of city uses. It is useful alike in the plodding car-horse, the lively horse for the grocer, the gentleman's stylish buggy-horse, the uncertain but useful hack-horse, and the sleek family horse. There is an increasing demand now for heavier, more sober, dignified, and less nervous horses for the family carriage, and this demand is sure to continue. For this, trotting blood crossed on some of the heavier and slower draft breeds is eminently suited both in form and disposition.

Again, horses bred on the dry hills of New England are believed to stand the wear of city streets better than those from the softer soil of the more level West. Personally I have no doubt but that this is a fact. I have questioned many liverymen and horse-car men in our Eastern cities on this very matter, and their opinion is well nigh unanimous. They tell me that Western horses are used because they are cheaper and are abundant, and because New England horses are not to be had. They say that the feet of the Western horses are not so good.

In conclusion, the great lesson I wish to inculcate is this: that hereafter, New England farmers must, as a class, pay more attention to the breeding than they lately have, and that they cannot afford to breed the poorer sorts of animals. I

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believe that she can better compete with the West in horse breeding than in cattle. Sheep seem doomed by the dogs living in the manufacturing villages, but horses can be produced here again, as they formerly were, and trotting blood is a valuable kind to consider.

The horse of old was the horse of the warrior or the horse of the rich, his use and possession confined to the favored classes. The trotter originated among the masses as soon as the people were free. He developed for use rather than for luxury, he is the horse for business as well as for pleasure, the horse for the bustle of the busy street as well as for the quiet country road. The horse of old was the horse of war and waste; the trotter is the horse of peace and thrift, the last and most useful breed of his species, developed to meet the needs of our modern and higher civilization.

Adjournment was made until 10 o'clock A. M., Thursday.

THURSDAY, February 12.

The morning session was called to order by the president as follows:

THE PRESIDENT: We commence at this time the programme of the second day. I was in hopes that I might see many more present. Still, what few are here are entitled to the best talent we have present with us. The subject this morning is one which will be of interest to all dairymen, and it is to be presented by Mr. Connor, president of the State Dairymen's Association. This association has been of great help to us in our work. In fact, their work is in line with ours as well as that of the Grange, and we are all working together in harmony.

I now introduce to you President Connor of the Dairymen's Association.

DAIRYING.

BY J. M. CONNOR, HOPKINTON.

It is assigned to me to speak upon this subject, as representing the dairy industry. When informed by the secretary of

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the Board of Agriculture that I was expected to do so, my first thought was, that this theme was getting a little threadbare; but upon further reflection, I saw that the most advanced dairymen in our State never were more eager to advance, never more desirous for light upon this great industry, than to-day.

I wish it were in my power to lead them up to a higher position than they now occupy. But if by any means I can be instrumental in spurring up the great army that constitute the rear guard in this industry, I shall feel that some good is accomplished.

While excelsior should ever be the motto of all, yet we feel a reasonable satisfaction in the advance made by a large number of the pioneer workers in our State in this advancing industry. All honor to the noble band of workers who have led the column in the grand march that has signalized such victories for a higher grade of dairying in the old Granite State for the past ten years. Still there are a multitude of farmers in this State, as well as elsewhere who are bound to their idols, and the one they worship most is the idol of self conceit.

In all the trades and professions, none manifest so little desire for mutual consultation and helpfulness as the farmer. He, of all others, thinks he knows it all. But it is an indisputable fact, that no occupation or industry requires more research, or in which greater advantage can be gained by mutual consultation than in the pursuits of agriculture. Many who are inclined to cast reproach upon rural pursuits because of its backward condition and lack of uniformity in production, too often forget the peculiar relation this industry bears to all other pursuits.

The massing together of all the smaller industries under the power of concentrated capital, employing armies of workmen under skilled directors, cannot fail to produce uniformity of results, and to cheapen production. But when we come to the industry we represent here, to-day, there will ever be obstacles in the way of perfecting such a system of control and concentration of effort.

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We are yet unable to reap the benefits of combined effort and capital, excepting in the single instance of the establishment of creameries, and here it can only partially be perfected. Breeding, and feeding, and much of the work in its first stages must ever remain to individual care.

If you desire to improve our system of railroading, if any suggestion could be offered to elevate manufacturing or any mechanical pursuits, you have only to go to a superintendent or a half dozen directors, not to the multitude of shareholders who have surrendered all control.

Not so in farming, in dairying; here every tiller of the soil stamps upon his production the condition of his own advancement. His trademark is a reflection of the progress he is making in the line of his industry. Dairying is more affected by this condition of things than any other farm specialty. There are more conditions affecting it, more mystery running through every minute detail, from the breeding of the delicate and wonderfully constructed cow, to the last touch put upon her golden product which enters into such universal consumption.

We have abundant reason for congratulation, that New Hampshire farmers have made such rapid improvement in dairy knowledge within the past ten years. Every coöperative creamery in the State, now numbering about forty, has sprung into existence within this period. The principles of breeding and feeding, and all lines of dairy work, are far better understood now than ten years ago. But are we satisfied to rest with our present attainments? Rather, are we not ashamed that, with all the light there is abroad, we are compelled to confess that the larger part of our farmers are plodding along, using methods wholly unprofitable? That a large proportion of the cows kept in this State, do not return their owners a living profit? There are many agencies working against the farmer, and he has reason to complain in some measure that he is not getting a fair return for his labor. But this will never excuse him for neglecting to put thought and energy into his business.

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We may mourn over our deserted farms and speculate as to the causes, but let us look the matter squarely in the face and call things by their right names. What has led to this condition of things, and what is working to-day to produce the same results, is nothing short of sheer mismanagement, deserted brain power, a shiftless, whimpering desire to get something out of nothing, a self conceit that will seek no advice from superiors. What we need to-day, most of all, is that farmers themselves shall give no quarter to that class of their fellow farmers whose methods and practices are such as must inevitably lead to deserted farms, abandoned homes, forsaken churches and schools, and a disgraced industry. If we would place this noble, God-ordained calling, this fountain source of all wealth and prosperity, on the high position it ought ever to occupy, we must not ignore the fact, that no class of people are doing more to trail our banner in the dust than those of our own calling.

I may be digressing from my subject, but what is true of farming as a whole, is equally, and with greater force, true of the dairy industry.

Those who are striving intelligently to grade up their dairy stock; who as the years go by are increasing their annual products per cow—and quality as well; who are adopting every device to save labor and improve quality; who read, think, and investigate, are not ashamed to consult their superiors. Such men will abide on the old homestead. Their names will not be found on the long roll of dishonor, published by the honorable commissioner of immigration. These are the men who "make two blades of grass to grow where one grew before," two pounds of butter to be produced now by the fine bred Guersey or Jersey of to-day where but one was obtained by the hap-hazard, ill-bred scrub of the past.

There is one thought that impresses me as worthy of more consideration than it receives, which is the lack of definite purpose too common among farmers. The lines are being drawn closer and closer in every profession and industry. Men are wanted to-day only for a special line of duty; and no man

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can succeed whose mind is constantly reverting from one line of work to another. The farmer cannot make himself an exception to this rule. No one man is big enough to comprehend and make a success of all branches of farming at one and the same time.

Enquire of almost every farmer you meet, why he does not give more attention to dairy matters, why not secure the services of better breeding animals, have more of the improved apparatus for his dairy work; and he will tell you that he is not doing enough in that line to make it pay to be to the expense, that he has no fixed purpose, that he is undecided as to what line of farming pays best. He formerly went into sheep raising, and that went down; then young cattle and beef, and that failed of remuneration; that he is half inclined to go into raising horses, but it has always been his luck, by the time he got fairly under way, the horse market would become glutted; and it would be so with dairying if he should go into it,—so he has come to the conclusion to have as many baskets as he has eggs, then he would not break but one at a time as he blunders about in the dark. Such a line of policy has caused more deserted farms, driven more young men off the old homestead, done more to depopulate our rural towns, than everything else combined. It is the broad road to destruction, broad because it is too broad for any one man to comprehend.

Dairying is objected to by many because it involves too much labor, and competent help cannot be obtained to conduct it. Too many are in the condition of the farmer alluded to above. They have been floundering about with no especial conveniences for anything.

In the modern creamery, everything is so arranged in point of convenience, that one or two men will accomplish a great amount of work. So, in the private dairy, proper utensils, convenient rooms with reference to both summer and winter work, right appliances for controlling temperature at both seasons, has much to do in determining the amount of labor, and very much to do with the quality of goods manufactured.

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After years of labor and investigation, and from a practical standpoint, we have no hesitation in saying that the cow and the pig, if rightly handled and made use of, will bring prosperity to the farmers of our State. The sale of their products carries little of the fertilizing elements off the farm, while the nature of the food which they require — which should be abundant and of the best quality — will fertilize our lands and increase their productive capacity. It is possible, yea, it is easily within the power of the farmers of New Hampshire, to increase the present product of our cows one hundred pounds each within the next ten years, and to double our pork product.

Our best dairies already exceed this increase, and what a few in every town are doing is easily within the reach of every one, if they will follow the example of the noble patterns that are scattered all up and down our State. Shame upon the man, be he farmer or otherwise, who will not submit himself to be taught by his superiors, when such teachings are in the line of his advancement and material prosperity; and equally discreditable it is in him who will not freely impart to his fellow farmer any knowledge which he possesses, that will raise such a one in the scale of his labors, and thus, by mutual helpfulness, elevate to a higher position of manhood and womanhood.

True it is, the breeding of superior animals, all the nicer points that enter into the compounding of her food, just how to develop all the nicer points in butter and cheese making, will be points for discussion and speculation. But no one need think that because of this, the task is a hopeless one. Discarding all nice distinctions, and in the light of plain matter of fact, who cannot breed up a cow, that without forcing — only by fair and liberal feeding — will produce from 225 to 275 pounds of butter yearly? We will take the medium product, 250 pounds, as the basis for our reckoning, this at 25 cents per pound — and this is no extravagant figure — we have $62.50; $12.50 for her calf and the value of the by-product for pig feeding — only a moderate estimate — and we

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have a round $75 as her yearly gross income. Who will not say that this is a reasonable statement and a satisfactory profit.

But what sort of a showing do the majority of the cows kept, in this State or any other, make from their present product? According to the report of the dairy commissioner of the great dairy State of New York — a State that has a capital invested in the dairying business of over $350,000,000, with upward of $1,500,000 cows, from a careful personal inspection in 1,284 butter and cheese factories — he found the average amount of milk produced per cow to be 3,034 pounds. These were the figures from which the patrons of the factories derived their income. He found also from these estimates, the average income from the cows to be less than $35 a year.

Take the great dairy State of Wisconsin, the home of some of the foremost dairy lights of this country. The average cow in Wisconsin produces about 115 pounds annually. From the last annual report of her dairy commissioner, I learn some astonishing facts. The commissioner made an analysis of the milk of over 400 different herds, and out of this number only five herds analyzed five per cent of butter fat; while the milk of my own herd was analyzed at the late annual meeting of our Dairymen's Association and tested five and one half per cent of butter fat.

I draw this comparison between our condition and that of two leading dairy States in this country. New Hampshire has made far more rapid advancement in dairying the past ten years, than either of these large dairy States. We have not their broad acres, nor their great herds; but we have peculiar soil and climate, we have people whose habits and customs are different from theirs, a people, who, for mechanical skill and power of research, can beat the world. No State is better equipped for the discussion of dairy topics. With a Grange in over half the towns in the State; its Dairymen's Association, which will soon reach every county in the State; its Board of Agriculture, holding upwards of twenty institutes in all parts of our domain; its Experiment Station, amply furnished for scien-

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tific investigations; with an agricultural press second to no other State of its size,— surely, when all these forces are at work with a will and a determination, who can dare predict what a power there is in such a force! No dilly-dally policy, no hesitating, doubting, Thomases can succeed in this industry. It must be put on a business basis. We are manufacturers and must know the power and quality of the machine we are running; we must know the power and quality of the feed these machines consume. We must test their capacity. We must discard every machine that does not come up to a certain standard of work.

What are the qualifications required of an engineer? They are very exacting. "Many are called but few are chosen."

But to run this machine we call a cow requires as much more knowledge than to run an engine, as the latter requires more than to run a wheelbarrow. The engine is an exhibition of man's imperfect works. The cow is the handiwork of an all-wise Creator.

MR. PHILBRICK, Vice-President: In the absence of the president it devolves upon me to assume his duties or try to do so as well as I can. I am going to call upon Professor Brewer to make a few remarks on this subject, as the hour has not expired.

PROF. BREWER: As Mr. Connor was speaking, two or three thoughts came into my mind.

There is one point which I do not think is sufficiently taken into account in any discussion of agricultural matters. There is no question but what farmers are more independent than any other men. They are more independent mentally than any other class of men, and it comes very largely from the fact, that they work alone and carry on different kinds of work that require the exercise of personal judgment. You take a lot of men at work in a factory of some kind with foremen or bosses to lay out their work, and then the most of that done by machinery, it does not make much difference whether those men have any brains or not. They work in a crowd,

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they keep in a crowd, to the loss of personal independence that exists among working-men in other avocations. The farmer works alone, or if not alone only two or three together, and his work calls continually on the exercise of independent judgment from the littlest to the biggest, from the simplest to the most complicated, operation. In everything that he does there is something that continually requires of him personal thought and personal judgment, and that cannot go on with any man, I care not what his avocation is, without educating him.

Farmers may not be quick to adopt new impressions, but when they take hold of them they take hold of them in earnest. Farming, as I have said before, gives them an independent judgment and it is of very great value when you get them started right.

Now a word regarding the dairy business in this State, and the State does not stand alone in the conditions which exist. In Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, and to a lesser extent in Maine, perhaps, there is a continual increase of the population in the towns, which continually improves the local markets for dairy products. My own belief is that the dairy business will continue to increase in those states, and that opinion is founded on several reasons. The first reason, and the one of the greatest importance perhaps, is that they can produce an exceedingly good product. I think, the world over, a hilly region will produce better butter than the level region, no matter how fertile the latter may be. I think, if you will look the matter over, you will find it is the hilly region that is noted for its butter and cheese, I say hilly region in distinction from the great flat and level portion of the country; then too, there is the upland region, of which there is so much in New England, as distinguished from the lowland region, and that is a factor in the production of a good product. Look how Switzerland was noted, and is still, for its dairy products — its butter and its cheese, and its milk also. The first time that I was ever in New Hampshire it struck me that there ought to be a good

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quality of milk in this State, and I stopped at a farm house and asked for a drink of milk. I did it in order to test the milk so far as it could be tested by the tasting. I was not disappointed in the result. I do not believe that the level prairies of the West will ever be able to produce quite so nice an article as can be produced in this State and in the neighboring States. I do not pretend to say what the reason is, but there is certainly a peculiar flavor and texture which they cannot quite equal. Some years ago, I recollect there was some butter shown at an exhibit, which was remarkable for its flavor. It was examined by Mr. Arner and he asked the maker: "Was this butter made on upland or lowland?" "On lowland," says the farmer. "Are your sure?" "Yes, I know it." The farmer was one whom Mr. Arner knew and he placed confidence in his statements. Finally he said, "It is the best butter I have ever seen made from the lowland. If I didn't know you and your reputation, I should think there was something wrong about the statement." The farmer remarked: "Well, I guess we misunderstand each other. What do you mean by lowland? There is a swale that runs through my farm, although the farm itself is one thousand and fifty feet above the place where we are talking. It is an old pasture and the ground has not been plowed for a good many years. I keep it for the cows in the summer season and they run in there." "That is just what I wanted to find out," replied the expert. "Now that was a hilly region and the pasture was an old one, and then combined with that, of course, the butter was well made.

There is a good deal of discussion regarding the part of the experiment station in dairy matters. There is no question but what the experiment station will be of great advantage to the dairy interests, but it will be almost entirely in the direction of increasing its product rather than the quality of the product. The quality of butter produced depends so much upon the butter maker. Supposing he has goods cows and good pasture. Begin with that and the quality of the butter for the rest depends upon the way it is made. Science has not taught

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us to make any better iron or steel than our ancestors could make. There is not a factory to-day that can make any better steel than that which was made out of the ore by hand forging. No steel now is any better than the old steel which used to be beaten into Damascus blades with hard work and great labor. There is now no iron any better than the wrought iron made out of the ore by hand forges. Science has taught man how to make large quantities of steel and iron at a minimum price. Steel used to be a pretty dear material. It cost, I don't know how much a ton. Now they make fair steel in sufficient abundance and cheap enough to make railroad rails, and our railroad rails are largely made of steel. But the steel is of no better quality than it used to be. So, it seems to me, it will be in the dairy business. Science will teach us how to make butter cheaper and in larger quantities but not of a better quality.

As Mr. Connor was speaking in regard to the matter of difference in cows, I thought I should like to say something on that point. The difference in cows that will give you five and one half per cent of butter fat and those that will give you but five per cent is enormous. There are very few manufacturing corporations that run on so wide a margin. What is the difference between five, and five and a half per cent? As applied to the percentage of butter fat in milk, it makes a big difference — two or three times the difference between positive loss and positive fortune. Among our great manufacturing corporations the great question is, how the product can be cheapened, or, what is the same thing, how can we get more product for the same amount of labor. Inventions are called in, engines are improved so that they may give you the largest amount of power with the least expenditure of coal, and so on through all the various kinds of machinery. If one man gets ahead faster than another, it is because he looks after the matter of economy in production more than the other. The great benefit of the sciences and the arts has been, after all, in that direction. While science has added many new things to our store of knowledge; while it has gone a

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great ways to increase our comfort in a manner never dreamed of before, — after all, its great work has been to improve the old processes and cheapen production of things like iron and steel. I allude to that, because that is something that you are all familiar with. It is one of the objects of the experiment stations to determine the relation which exists between feeding and the milk, in order that the farmers may take advantage of that relation. When they show that a cow may be made to give milk containing five and one half per cent of butter fat instead of five per cent, then the farmer will be placed in a great deal better position. It is in that direction that you are to expect the most benefit from experiment stations and scientific work.

I have not as much faith as a great many have in the advantage of the agricultural schools in attracting the boys to work on the farm. I have great faith in the indirect influence of the experiment station and the knowledge derived from it, in the form I have suggested. Only a few boys among the many can go to the agricultural school to be educated for farm work, but every farmer, from the poorest to the best, can be benefited in the direction I have already spoken of. It is not probable that the time will ever come when we can make our millions from cows, even though they may be of the best herds. Nevertheless, the increase in product that may be brought about without a corresponding increase in the expense is very great. And it behooves enterprising farmers to keep in mind the difference between five per cent and five and one half per cent of butter in milk. It is more than twelve per cent on the total product.

So, too, in price. I was once at a cheese convention in which the wail was, at that particular time, the price of cheese. A, B, C, and D were discussing how little they could get for cheese. One man got up and said how much he got for his cheese. He looked like a good, substantial farmer. I believe he made his own cheese. Somebody got up and was going to squelch him by the question, "How much do you get for your cheese?" He gave a price which was

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twice and a half the average price. He didn't, however, spend twice and a half as much work upon it or anything like it. He had made cheese for years, and had obtained this fair price for all he could produce, right along. He did not look as though he was worrying over the price of cheese, not a bit of it. His only wish was that he had a little more of it to sell (Laughter). If you strive in the direction of a better article, you will increase the price of the butter whose quality is thus enhanced more than you do the labor that you put upon it. I believe that can be done.

THE VICE-PRESIDENT: There are many others that I see before me whom I should like to call upon to continue this discussion, but the hour dedicated to this subject has expired. We have with us a member of the Massachusetts State Board of Agriculture who stands at the head of market gardeners in New England. A man who started with his two hands and has worked himself up until he is one of the leading lights in market gardening. It now gives me pleasure to introduce to you Mr. W. W. Rawson of Boston, who will now address you.

MARKET GARDENING UNDER GLASS.

BY W. W. RAWSON, ARLINGTON, MASS.

In presenting this subject I shall speak from my own practical experience for the past twenty-five years. It has been my constant study, and I have obtained better results and more satisfaction from the cultivation under glass than from the open field. After understanding the nature of the plants it is a very easy matter to grow them under glass where all conditions of the atmosphere can be controlled, which is done by using steam or hot water for heating and water for irrigation.

Plants require light, air, heat, and moisture; and like Faith, Hope, and Charity, the greatest of which is Charity, so the greatest of these is moisture. The light is supplied by the sun, moon, and by the electric light; air, by ventilation in

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different ways, according to the situation; heat, by steam, hot water, or by hot manure placed under the plants; and moisture, by irrigation supplied by either wind-mill or steam pump, but the steam pump is the only one to depend upon where large quantities are required. When houses are heated by steam a pump can be run very easily at a very small expense by placing one by the side of the boiler, and taking the water from a well or stream, if the distance is not over twenty feet. The water can be pumped into tanks and warmed to any temperature required before putting it on the plants; or if in the spring or summer it can be put on the plants direct from the pump. Both ways are arranged for where much water is required. In many cases in the winter season very little is necessary, and a tank of three or four thousand gallons capacity being on hand at any time the pump will have to be used only when the tank gets empty, which may be once a week. But in the spring and summer time it will need to be used nearly every day. I know it is very expensive to fit up an arrangement of this kind, but the benefit derived soon pays for the outlay, and it is better where required at all to have a good sized pump and no pipes less than two inches in size.

There are quite a variety of vegetables grown under glass at the present time, among which are asparagus, lettuce, cucumbers, radishes, beets, rhubarb, parsley, spearmint, tomatoes, cauliflowers, melons, and carrots.

Asparagus can be grown under glass by placing the roots thickly in a bed in the field and placing the glass on the bed, having the plank put down in the fall and a heavy coat of manure put inside the bed, so as to allow the ground to freeze but very little. The glass should be placed on the bed early in March, cutting can commence in April, and by the time out-door asparagus comes on the grass crop will be done. Then the bed should be allowed to grow up to seed and be prepared again another year the same way. To grow in hot houses the roots should be dug in the fall, placed in a cool cellar, and put into the houses early in the winter. In

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four weeks after the roots are placed in the house, cutting will commence. After cutting for six weeks, the roots are taken out and are of no further use.

Lettuce is grown very largely in the market gardens all the year round, but nine months of this time it is grown under glass. It requires constant care. Two transplantings are required, as it will head better where two transplantings are made than it will if only one is made. The seed sown September 1 will mature for market early in November; that sown October 1 will mature the last of December; that sown November 1 will mature February 1 to March 1; that sown January 1 will mature in March; that sown February 1 will mature in April. It takes, on an average, about three months to grow a crop, but more time is required in the short days of December and January. This can be partially overcome by the use of the electric light, which by a trial of mine, increased its growth fifteen per cent while it increased its quality ten per cent, so that the increase in time and quality equaled twenty-five per cent. The temperature required for the growth of lettuce is from 40 to 60 degrees, and this is the temperature of the month of May, which is the time of year that lettuce grows to the greatest perfection. The headed variety is the kind mostly grown in New England; the White Seed Tennisball is the variety grown under glass, and the Black Seed variety is used for field culture. The lettuce crop is the most valuable one grown by market gardeners, and it requires many years of experience to grow it to perfection. It is sold by the dozen, or by the barrel-box or barrel at wholesale. There are large quantities sent to New York by growers around Boston. The growing of lettuce in the winter is quite a business in that locality. The lettuce is transplanted the first time three and one-half inches apart, either in the house or hot-bed, and after four or five weeks is again transplanted to seven inches apart, where it is allowed to mature. It is necessary in the hot-bed to have the heat supplied from under the loam. This is done by putting hot stable manure about twelve inches deep in the bed which

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has been prepared for the purpose. Then put on the manure about eight inches of loam worked very fine before putting in the plants. Very little manure, if any, is needed for the plants, but some should be added to head the lettuce. The plants can be grown much easier in the houses than in the beds; and when understood lettuce can be headed better and easier in houses, but to those inexperienced the heading under sash will be the most satisfactory. Some years ago it was considered that lettuce must bring $1.00 per dozen to be profitable, but now it can be grown at a profit for fifty cents per dozen, and much better lettuce at that. Some may ask: How much manure does it require to grow a crop of lettuce? When the heat is supplied by fresh stable manure it takes one foot, cord measure, for every hot-bed sash or one cord for eight sash, so that nearly all the coarse manure teamed in winter by market gardeners is used in their hot-beds. After the crop of lettuce is off, another one is put into the same house or a crop of cucumbers is put in. But to make the most of the houses three crops of lettuce are grown and one crop of cucumbers. The cucumbers being the last crop are generally started by the first of February, set out in the house the middle of March, and full grown cucumbers can be picked in four weeks after the last transplanting. The cucumbers are sown in a warm bed or in a box kept in a very warm place, at a temperature of 80 to 90 degrees. After the plants are up, say two days, transplant them into hills, four plants in each, where they may be kept at a temperature of 70 degrees until put into the house in hills two feet apart in the row, and two rows in a house twenty-four feet wide.

When the vines begin to run, they should be tied up on a frame made of narrow strips of board one way and laths or wire the other. The vines will soon cover the trellis and the blossoms will appear. These should be fertilized by bees, which may be put into the house as soon as the blossoms appear. This must be done or the process may be done by hand, but it takes one of experience to do this and it is not often practiced. The cucumbers can be picked in two weeks

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from the blow and can easily be seen hanging down on the trellis. After the cucumbers are done bearing, the houses can be cleaned out and again prepared for lettuce in the fall. The cucumbers generally last until about the middle of July. The glass on the hot-beds, after having been used for one or two crops of lettuce, a crop of radishes, carrots, or beets, can then be used for cucumbers by putting down two rows of plank the proper distance apart and by digging a trench two feet deep and two feet wide, putting in one foot in depth of hot stable manure. After the ground becomes warm, set the cucumbers on the hot manure or over it, and keep the temperature above sixty degrees; they will grow to maturity in about six weeks, the plants having been prepared previously in hills as described for the houses. The glass must remain on the beds until July 1, being raised every day. The bees do not have to be put into the beds, as they go in of their own accord when the glass is raised; or the cucumbers may be fertilized by the wind, as they are in the open field. I will not speak of the amount of cucumbers that are or may be taken from houses or beds, but the quantity varies with the season and the care and management of the houses and beds. They can be easily injured by inattention, and are often lost by not having sufficient heat, the houses being run at too low a temperature.

In the hot-beds, after a crop of lettuce is taken off, a crop of radishes can be grown in the same heat; but if lettuce is to follow again, a new heat must be supplied, or partially new. Radishes do not require as much heat, and can be sown, and are often sown, with either carrots or beets, every third row of four inches apart made crosswise of the bed with a marker prepared for the purpose. The radish is a very quick-growing crop and can be grown so quickly that before the carrots or beets that are sown between them are large enough to thin out, the radish crop is gone. Then the whole space is utilized for the other crop, which will mature in six or eight weeks more.

I have described how glass can be used for one crop of radishes and one of either carrots or beets before using the

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glass for cucumbers, and all this done before the middle of April, by putting the lettuce in from December 15 to January 1. But the last crop does not require the glass after the radishes are gone, nor when the radishes are growing if it be after April 10. The carrots are thinned out about two inches apart and then left to mature, pulling them for market the last of May or the first of June. The beets are thinned out to four inches apart, those taken out are used for greens and the rest allowed to remain until large enough to bunch, which is sometime in May or by June 1. They bring very good prices at this season, and sometimes it is very difficult to tell, unless a correct account is kept, which crop of the three I have just mentioned pays the best.

Parsley is used to a very large extent at the present time, and is salable all the year. It is sown in spring in the open ground, thinned out to four inches apart so as to produce large roots, and cut two or three times during the summer; and then in September the roots are transplanted to hothouses or hot-beds, setting the roots three inches in the row and the rows six inches apart; or the glass can be put on the crop where it has been growing all summer and continue cutting through the winter. But if it is grown in the hothouse transplanting will be necessary.

Rhubard is a very large field crop and can also be forced under glass and in hothouses. That forced under glass must be covered with manure and plank be put down in the fall, placing the glass on in March. This is pulled twice before the outdoor crop and then left for another season. That grown in houses must be dug in the fall, placed in the cellar, and put into the house or forcing-pit early in January, so as to come into Market in March.

Spearmint is a plant that grows from long roots dug from the ground, and when transplanted into houses or beds can be cut all winter into small bunches and sold at large prices for making juleps and sauces for spring lamb for the table. The demand is quite limited, and therefore small quantities are grown.

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Tomatoes are grown quite largely under glass in houses. They are started in July and grow quite slowly through the fall and winter, and in the spring bear their fruit. The price obtained for them is about fifty cents per pound, which is $30 per bushel. A house full would not amount to as much as one of cucumbers, but they are not so much care as cucumbers. Only a few of the very dwarf kinds can be grown under glass, such as the Champion, Prelude, and Atlantic Prize.

Cauliflowers are started early in winter and are transplanted in the houses and grown as a spring crop, coming into market in May and June. They are grown in this manner largely on Long Island. The very dwarf varieties are the only ones that can be forced.

There are few crops that cannot be grown under glass, but many of them will not pay for growing. They are shipped in such large quantities from the South in spring that the price is not enough to warrant the attempt to grow them under glass.

In Montreal the melon is the principal crop grown under sash, and in New England they can be grown to perfection only in this way.

To command the best price for stock of any kind, the best animals must be procured to produce that stock. The best butter is obtained from the highest standard of milk. So the best vegetables can be produced only by the use of glass, where all the conditions required to produce them can be controlled. Our climate has changed in the last ten years to a great extent, and cannot be depended upon as previously. Some years ago melons and cucumbers could be grown in the open field to perfection, but now they can be grown only under glass.

HOTHOUSES.

These have been used for vegetable-growing only about ten years in this vicinity, or near Boston, but many are now used. The expense of building them is quite considerable. To build a house 24 feet wide will cost $10 per running foot;

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that is, a house 200 feet long and 24 feet wide will cost $2,000 with everything complete. One thirty feet wide will cost but little more — perhaps $200.

The slant of these houses, where they are erected for growing lettuce early and cucumbers late, is one foot to every four feet in length of rafter. For a house for cucumbers only, I would prefer a steeper one with slant both ways, the house for lettuce slanting only one way. The lettuce house should slant to the sun, while the cucumber house should end towards the sun or towards the south. The cucumber house should have two thicknesses of glass and the lettuce house one thickness double thick.

HEATING HOUSES.

There are different ways of heating houses — by a flue, by hot water, and by steam. The oldest way is by a flue, placing the boiler at the low end and making the chimney at the other end, with a brick flue through the house. A short house can be heated in this way very cheaply. The hot water method is best for small houses or a number of small ones where you do not do enough business to keep a night man.

To heat a house twenty-four feet wide, ten 2-inch iron pipes are required, placed at not over six feet apart, with two pipes on either side and the boiler at the lowest end. To heat by steam, eight 1¼-inch pipes will be sufficient, placed at about the same distance apart. There is not much difference in the quantity of coal used by hot water or steam to produce the same temperature.

To heat a house for the season, from October 1 to May 1, a period of seven months, will require for a 24-foot house two tons to every ten feet in length, but the larger the house the less coal in proportion will be required; for a house 100 feet long, twenty tons of coal will be required; for a house 200 feet long, thirty-five tons; while for a house 300 feet long, only fifty tons will be needed. This is to grow lettuce until March and then cucumbers, but if cucumbers are to be grown all the year more coal will be required, because the temperature must be kept higher.

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Most of the houses being built at the present time are thirty feet wide and are considered more economical than narrower ones. It costs more to put in the heating apparatus for hot water than for steam, the pipes being much larger and more of them. One 1¼-inch pipe for steam is equal to one 4-inch pipe for hot water.

SASH.

The sashes used for forcing are three feet by six feet in size, with frames two inches thick and five rows of double thick glass six by eight inches in size and lapped about one eighth of an inch over each other. They are much stronger when lapped than when butted, will last longer, and are warmer. A well-made sash will last a number of years. I have some that are twenty-five years old and they are good now. The sash should be kept under cover in summer and should be painted every three years. Large quantities are used by market gardeners, and while they cost about $2.25 each, will always bring a good price if obliged to be sold at any time, especially if they were the best to start with; so there is not much depreciation in sashes, and generally they will produce every year enough to pay their cost.

Under glass the various insects that trouble vegetation can be more easily taken care of than in the field. In stormy weather it is also more pleasant to work in the houses than it is to work out of doors. It is also more profitable to use the houses when understood, but more expensive to commence.

In some foreign countries, nearly all the fine vegetables produced are grown in houses. Our climate here in New England is getting to be so variable that the only way to be sure of a crop and to have a continuous one is to grow it in houses, especially where the climate is such that there are frosts nearly every month in the year. The demand for fine vegetables is increasing to a large extent, and will continue to do so, and the demand for young men who understand this business is greater than for any other branch of agriculture. Good salaries will be paid to those who educate themselves to follow this calling, and any one who understands this business will

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have no trouble in obtaining a situation or of getting a good living for himself and family.

All of our best and most perfect flowers are grown in houses, and the business is somewhat overdone; but in the market garden business it is different. Flowers are a luxury and can be had only by those of large means, while vegetables are not only a luxury but they are also necessary for table use and cannot well be dispensed with.

A market gardener of to-day cannot afford to be without a hothouse or a number of them. The use of them will increase all over the Northern States and all the market gardeners will find it to their advantage to cultivate less acreage of out-door crops and devote more of their time and attention to the growth of vegetables under glass.

Many advances have been made in many departments of agriculture the last thirty or forty years, and the same is true of all branches of business. We have gone from traveling by horse to steam, and from that to electricity; from the oil lamp to kerosene, then to gas, and then to electricity; from nearly everything made by hand to that made by machinery; from the cow fed on hay to the one fed from the silo; from the large farm to the small farm. And here I may say that the reason for so many deserted farms is, that everything is being concentrated and the way-back farmer is obliged to move near the city, carry on less acres, and produce more goods for less money. So it is with market gardening. It began in the field with one crop each year, then two crops, now three or four, and from many kinds of crops to a few which are the most used in the locality, and then under glass where all the conditions can be controlled and more and better results be obtained.

But to be successful in this branch requires much study and practical experience. A large amount of capital is required, and with all these great results must be obtained or it would not pay.

In this locality with a cool climate and short season, the use of glass will become a necessity, and the first to build a large

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greenhouse will be the leading one among you, though he may, and will be, called a fool or a crazy man. The great improvement in producing crops made the past twenty years is only a commencement of what is sure to come in the next twenty, and in that time I expect to see, or those may who live to see that time, many large greenhouses in this city and surrounding towns, where can be grown all vegetables needed for your market in the winter as well as in the summer; and to those who understand it will come sure success and they will be well pleased with their trial of market gardening under glass.

MR. PHILBRICK: I would like to know the variety of beet you use.

MR. RAWSON: The Improved Egyptian. That is about the only sort that can be forced. The seed of that particular kind has not been in the market a very great while. There are only one or two men in the country that hold that seed. I am the one that introduced the seed.

MR. PHILBRICK: You are the man that improved it?

MR. RAWSON: I am not the man that first improved it. I got the beet and put it into the market and continued to improve it. I got two dollars and fifty cents a pound for the seed until last year. Last year I sold it for a dollar.

MR. GERRISH: How far apart do you have your beets for a late crop?

MR. RAWSON: I drill in the seed, and thin out the beets about a foot apart — that is, the beets you grow for fall use. If you do not wish to have them grow very large, you thin them out so they will be four or five inches apart. The beets under the sash, of course, have got plenty of nourishment supplied to them right along. If not, you can give it to them. So you can grow those quite closely together, while those in the field you have to give more room and should thin them out about twelve inches apart.

MR. CONNOR: Can you tell how a farmer of ordinary means can keep his beets during the winter?

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MR. RAWSON: He wants to pull them before they freeze very hard in the fall. They will stand a freeze of perhaps twenty-four degrees, but I don't like to have it go down to twenty. I generally pack them in a narrow trench in the fall and throw over them some dirt. I leave them there until the ground freezes a little, then I put them into a pit that I build purposely for them. I cover them with boards and pitch the boards so that the water will be carried off, and place a little sand on them. That is the way I keep mine. But the beets may be kept in the trench where first placed. I would rather have the ground freeze on top of the beets than not, in order to keep them.

MR. CONNOR: How would you store them in a cellar?

MR. RAWSON: I would not store them there.

MR. GERRISH: Enough for the family — a barrel of beets.

MR. RAWSON: I would place the beets in the coolest part of the cellar and cover them with sand. I was speaking of two or three hundred bushels. I suppose that the difficulty you have is that you put them in too soon after you pull them. Leave them out for some time after you pull them, and you will find them in better condition to keep. They should be perfectly cooled in order to keep.

MR. PHILBRICK: The trouble with the beets is that they shrivel.

MR. RAWSON: They are put in too soon or else they are left out and allowed to chill, and they commence to decay before they are put in. Take them up as soon as it begins to freeze a little and put them into a hole somewhere, putting three or four inches of dirt over them, but do not leave them in the ground until they are frozen.

QUESTION: Would you cut the tops off?

MR. RAWSON: Cut them off or twist them off. I should think they would keep as well to twist them off, especially if you cut them too close.

QUESTION: Sometimes we find beets scabby like potatoes.

MR. RAWSON: You have got some worms on the land. I should say a little lime would be good if you had anything of

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the kind there. By putting lime on, I don't think you would have any trouble. We have very little trouble in that way, because we have so many beets that they have enough to do. Once in a while we will have a beet eaten, but not very many.

The Montreal melon is considered the very best, but they are grown entirely under glass. I have never seen a water-melon grown under glass, only the muskmelon or cantaloupe melons. There is no limit to the price. I have sold them four for ten dollars — two and a half dollars apiece. In Montreal they grow them very largely. I was in Montreal a few years ago and saw them in the market. I bought a dozen of the melons, paying the man five dollars for them. I planted the seed the next season and got a tremendous crop. I sold two thousand dollars worth that grew on a half acre of land.

MR. GERRISH: Do you go North for your seed?

MR. RAWSON: Yes, sir, I do.

QUESTION: Do you find more difference in melons than anything else that you go North for your seeds?

MR. RAWSON: No, sir, I do not know that I do.

QUESTION: Is that difference more apparent than in anything else — more than in squashes?

MR. RAWSON: Not at all. The melon seed is like the squash seed. Nature controls the elements in such a shape that we cannot produce the squash seed and guarantee that it is pure.

MR. CURTIS: How can you get them pure?

MR. RAWSON: We get them as pure as we can. The bees will mix them if there are any melons of a different kind within a mile or two, and you cannot help it.

MR. GERRISH: Can you raise any squash where the vines are united?

MR. RAWSON: You will not have any seed at all to do any good.

QUESTION: Where are your seeds grown?

MR. RAWSON: I have a few of them grown in Burlington, Vt., and the northern part of Vermont. The greater portion of my seeds are grown at North Olcott; I think nearly all of them.

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MR. SESSIONS: Is not that largely because the customers are more particular and you cannot satisfy the market with the same kind of product that you could a few years ago?

MR. RAWSON: No, sir; I cannot get a good crop. If I could get a good crop, I would produce it.

MR. SESSIONS: What would satisfy the market ten years ago will not satisfy it to-day?

MR. RAWSON: No, sir, in one sense of the word it will not. When you get hold of these Montreal melons, the small cantaloupes are of no consequence. They want the other. Still I cannot grow them. The seasons are not long enough and there are sudden changes in the weather. A big rain storm on a piece of melons will kill them.

MR. CONNOR: It seems to me that you cannot attribute that all to the change of climate. We used to raise big crops of boys around here.

MR. RAWSON: I lay this to the climate.

MR. CONNOR: We did not use to have any trouble raising them; now we have a good deal of it.

MR. GERRISH: They raise them under glass too much.

MR. CONNOR: Yes; too much of the hothouse process is the trouble. They don't take the glass off soon enough.

MR. PHILBRICK: You have not told us whether you heat with steam or with hot water.

MR. RAWSON: I put in hot water when I first built my houses. I put up three large houses, 160 by 24 feet, and I put in hot water. After I had run them one winter I found that the boilers were not large enough. There were three boilers, one for each house. I wanted a steam boiler to do my pumping, and after putting that in I thought that I would run a steam pipe through to each one of the houses — one out and one return — from this steam boiler. After I placed those in the houses, I used to run the steam boiler in connection with the hot water boilers. I found that I would not require but one boiler to heat the three houses with steam, and made up my mind that I would rather take care of one boiler than of three. I built two or three more houses and heated

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them by steam, and I am running them by steam to this day. I think I was the first one to introduce steam in running a greenhouse — in our locality at least.

I have spoken here of the electric light. Perhaps that may seem peculiar to some of you, and I want to tell you how I happened to use it. On different sides of my house I set out a great many plants in the spring of the year, perhaps three thousand different plants. On the north side I found that I could not grow the plants very well. They would grow stunted and slow all summer. Two or three years afterwards, I think about five years ago, the town adopted the electric light in place of the gas light, and there was one of these arc lights placed within about seventy-five feet of my house. This was of two thousand candle power. I set out my plants that year as usual. The plants on the north side of my house grew better that year than on the south side. Of course I attributed it to the electric light. I immediately contracted with the electric light company to put me up an electric light over my greenhouses and also incandescent lights inside. The incandescent lights did not work well and they were taken out, but the arc light I found of great advantage. It did not cost me a great amount to try the experiment — one hundred dollars or so; yet I was satisfied that it was three or four hundred dollars benefit to me. I tried that for three months and found that it reduced the time required to mature the crops fifteen per cent.

MR. PHILBRICK: Have you ever tried sending an electric current in the earth in which your plants were growing?

MR. RAWSON: No, sir.

MR. PHILBRICK: I have read of its being tried and being a success.

MR. RAWSON: The town was using so many lights that I could not keep them this year, but next year they are going to put in another line and I shall put up three electric lights.

PROF. WHITCHER: Do you have them outside of your houses or on the inside?

MR. RAWSON: The arc light is on the outside of the houses

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and shines on the plants through the glass, just the same as the sun, increasing the length of the day.

PROF. BREWER: You are well satisfied that it is a benefit to you?

MR. RAWSON: Yes, sir.

QUESTION: How much would such business pay a young man?

MR. RAWSON: One hundred dollars a month.

VOICE: I want a young man, and I will pay him a hundred dollars a month if he is capable.

MR. RAWSON: I can make use of twenty-five men of that kind.

MR. CURTIS: Will you board him?

MR. RAWSON: Yes, if he is a first-class workman; we need some good workmen.

MR. CURTIS: Where shall they go to learn?

VOICE: Go to Rawson.

MR. RAWSON: I will give it up. Where they come to me they don't get away very soon.

MR. CURTIS: You would not like to have a lot of students around?

MR. RAWSON: I do not know as I would; still, I feel as though I ought to have some.

PROF. BREWER: How far could this business be taught in schools?

MR. RAWSON: It can be taught to a very small extent.

PROF. BREWER: And only to a small extent?

MR. RAWSON: And only to a small extent.

PROF. BREWER: That is, supposing you had an agricultural class of fifty; could you teach the fifty?

MR. RAWSON: If I had the school on the place I could teach them.

MR. GERRISH: How many boys could you get into your house at a time to show them how to do it?

MR. RAWSON: A good many of them.

MR. GERRISH: Fifty?

MR. RAWSON: Yes, sir. I have a house that would hold from one hundred and fifty to two hundred.

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PROF. WHITCHER: Could you give them the necessary attention if you had fifty?

MR. RAWSON: Certainly I could, and I would if I was paid for it.

PROF. WHITCHER: You think it is possible to give a class of fifty the personal attention needed?

MR. RAWSON: I could not do it as well as with three or four.

MR. CURTIS: You could let them work with your men?

MR. RAWSON: Yes. The trouble with me is to get them boarded.

QUESTION: You go to work before nine o'clock on your place?

MR. RAWSON: Yes, we believe in the eight-hour law — eight hours right straight along; eight hours in the forenoon and eight hours in the afternoon. We are not exactly like the labor lodges. They want eight hours for work, eight hours for play, and eight hours for sleep. I have found it takes about sixteen hours for me to get around, and I have had to conform to that right straight along.

In speaking of this subject of education in this business, I would say that I do not know of any way but the practical. It can be done in that way, but it would have to take from three to five years. That would be little time enough. It has taken me twenty-five years to get where I am, and a little more than that.

MR. SESSIONS: Are you learning still?

MR. RAWSON: Yes, every day, and I have to be a pretty apt scholar sometimes, too.

PROF. BREWER: You have paid something for your education?

MR. RAWSON: Yes, it has cost me very dear; and I am afraid that I should want enough to repay me if I was going to educate twenty-five or thirty young men. I should want a pretty good salary. I would do it on a salary if it would not frighten them. I should want as much as I was getting in my other business, and then I could afford to do it and follow it up.

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MR. PHILBRICK: You said that this spring you were having some young men go there to learn the business. Do you give them any compensation the first season?

MR. RAWSON: Of course I do. I give them the same as the laboring man, provided they board themselves and do as the rest do. I tell them that if they do not do a day's work the same as the rest of the men, I shall have to give them pay accordingly. I do not charge them anything at all.

MR. SESSIONS: Why cannot he have his hothouse ten miles out of the city just as well as five?

MR. RAWSON: He is so much farther from the market, that it would cost him more to get his produce to the market and the manure from the city to his place.

QUESTION: Is it not more largely on account of being where you can get the manure conveniently than on account of shipping the produce?

MR. RAWSON: Yes, sir.

PROF. BREWER: I strongly suspect that you cannot find a place in the United States where grain can be raised at a profit twenty miles from the place of shipment. I went all through the grain regions of the West, and as soon as you got over ten miles beyond the railroad the extra expense of carting ate up all the profits.

MR. RAWSON: Of course it costs a man more to cart his goods than to send them by rail. Then again, if a man is near the market and the market happens to be in want of any little thing, he can supply them; and if there is any catch in the market, it will be the man near the market that can take the advantage of it and not the one ten miles out.

The farmers of to-day have had the idea, that if they had twenty-five cords of manure they must scatter it over ten or twelve acres, whereas, it would be better to put it on two acres. If they wanted to raise one thousand bushels of potatoes on two acres, they might do it in good shape. I would put my manure on two acres, and I would put my work there too. I could grow potatoes at forty cents a bushel on two acres where I could not for fifty cents on five.

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PROF. BREWER: Are not plant lice on vegetables grown under glass very common?

MR. RAWSON: They are very common, and if the proper methods are not pursued to get rid of them, they will do much damage. I smoke all my houses whether I know there are plant lice there or not. When the plants are quite young, — generally after two or three weeks' growth, — I have to smoke all my houses where those plants are. I use tobacco in smoking them. I smoke them three or four nights running. The first night will not kill them; the second night will make them kind of drowsy; the third night lays them all on the ground so that you can see them; the fourth night will complete the job. But if you smoke them one night and leave them three or four nights, they will get a fresh hold.

QUESTION: Tobacco is not harmful to the plants?

MR. RAWSON: No, sir, if you do not burn the tobacco so that the plants will get the full strength of the fumes. Soak the tobacco with water before you put it into the heater, then put it into the heater and put a fire in. When you have got it to smoking in about the right shape, take your fire out of the heater, and set the heater in the house. When you have got the house thoroughly smoked, do not leave the heater standing there, but take it and go into another house. One man can smoke three houses like mine in a short time.

MR. CONNOR: Do you fill the houses full of smoke?

MR. RAWSON: Solid full, so you cannot see your hand.

QUESTION: Cabbages that were not quite headed last fall, would it be advisable to leave them in the ground until warm weather and head them more?

MR. RAWSON: That would depend with me upon how they sell.

QUESTION: For my own use.

MR. RAWSON: I should keep them covered well until warm weather came.

QUESTION: Would they put on an extra heading to leave them until warm weather?

MR. RAWSON: I do not think they will. They will keep

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on heading to a small extent, but you will find that cabbages put in in the fall would nearly all be headed quite well at this time. They will do well enough to carry to the market and get one dollar and fifty cents or two dollars a barrel for them, and that is good enough for me.

QUESTION: Is there any way of keeping the insects off from very early turnips?

MR. RAWSON: I do not know of any, except not to plant them.

MR. PHILBRICK: What do you say about keeping the striped bugs from your cucumbers and squashes?

MR. RAWSON: I use ground plaster and Paris green.

MR. PHILBRICK: Calcine plaster?

MR. RAWSON: Yes.

MR. CURTIS: In what way?

MR. RAWSON: I generally mix half a barrel with a half pound of Paris green and sprinkle it over them.

MR. SESSIONS: How much weight is a barrel of plaster?

MR. RAWSON: Two hundred and fifty pounds.

QUESTION: A flour barrel?

MR. RAWSON: They come in casks, a common lime cask, and a pound of Paris green to that.

PROF. WHITCHER: Do you mean common land plaster?

MR. RAWSON: No, not common land plaster — similar to plaster of Paris.

PROF. WHITCHER: Is it not just white gypsum?

MR. RAWSON: I suppose it is.

MR. GERRISH: Is this plaster finer than ordinary plaster bought by the ton?

MR. RAWSON: It is.

MR. PHILBRICK: That is all the advantage it possesses?

MR. RAWSON: That is all; flour might do just as well.

MR. CURTIS: How would spraying do?

MR. RAWSON: I think that would have the same effect, but it would take a little longer to make the spraying apparatus.

MR. CURTIS: I am speaking of a small patch.

MR. RAWSON: I should think it would do as well; take a fine spraying water-pot.

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MR. GERRISH: You would have to watch the weather when you did it in that way. You have got to do it when it does not rain.

QUESTION: Is not one advantage of calcine plaster that it stays on better?

MR. RAWSON: Yes, it stays on better. I have to use it about three times a year. I do not know how many barrels of plaster I use, probably eight or ten.

MR. CONNOR: How about the black bugs that work underneath?

MR. RAWSON: I would catch them by placing shingles on the ground.

QUESTION: How do you keep your squashes from rotting in the winter?

MR. RAWSON: I sell them in the fall. But the best way to keep them is to have a house purposely for them, having the temperature from forty to forty-five degrees. Do not place them too thickly on your shelves. I keep mine the other way by selling them in the fall and getting rid of them. I have so many vegetables that I am obliged to sell everything as it grows.

MEMBER: In other words, you keep your squashes in your pocket.

MR. RAWSON: I get them there, but they don't stay there long.

Perhaps some of you have not much of an idea what market gardening is. Through the summer time I keep seventy-five men, have market wagons running every day in the year. I have forty men at the present time. That may enable some of you to imagine what the business is.

I have recommended small acreage. I cultivate one hundred acres. Some of you may say that I do not follow out my own theory. The reason I have so much land is this: I am obliged, carrying on so large a business as I do and having so much glass, to use a certain quantity of manure in the winter time. I am also obliged to have that manure teamed out from the stables in the summer time as well as in the win-

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ter, in order to have it near by when I want it. For that reason I buy my manure in large quantities and in the summer time I team it out from Boston and pile it up. Of course I have to have some land to pile it on. Also after the manure has been once used in the beds, you cannot very well sell it again, although there is some goodness in it still, and the most valuable way for me to utilize it is to have land to spread it on. I buy from twenty-five hundred to three thousand cords of manure, and I am obliged to have some place to pile it; for that reason I have as many as one hundred acres.

QUESTION: What does manure cost at the stables?

MR. RAWSON: One dollar a cord.

QUESTION: Not much straw?

MR. RAWSON: Yes, considerable straw. Manure during the past few years has reduced in price one half.

QUESTION: Is not that owing to a reduction in fertilizer? Is not that due to the reduced cost of phosphates?

MR. RAWSON: I do not know as it is — no, sir.

QUESTION: Is phosphate a good substitute for manure, take it in your business?

MR. RAWSON: No, sir.

QUESTION: You use some phosphate, do you not?

MR. RAWSON: Very little. I use it concentrated; that is, I use sulphate of ammonia, nitrate of soda, and muriate of potash to a small extent. I use some fifty tons of wood ashes, four or five tons of ammonia; but as to a substitute for manure, I do not believe they have got it yet.

VICE-PRESIDENT: This discussion is very interesting and I would like to have it continued farther, but it is past the time of adjournment. This afternoon we have a programme which I think will be of interest to you all.

Adjourned to 2 P. M.

AFTERNOON SESSION.

At 2 P. M. the meeting was called to order by the president, who immediately introduced Hon. W. R. Sessions to address the meeting.

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HINDRANCES TO SUCCESSFUL FARMING.

BY HON. W. R. SESSIONS, SECRETARY OF MASSACHUSETTS STATE BOARD OF AGRICULTURE.

There are many of these obstacles, some beyond our control that must be endured, or overcome, or worked around, as the case may be. Of this class, New Hampshire is said to have its full share.

The American additions to Chambers' Encyclopædia, published in 1881, says: "For many years its agricultural interests have been declining. The soil never was very fertile, and much of the land which was once productive has become worn out by long use. This fact in connection with the severity of the climate has caused many of the younger generation to seek new advantages in the West." In the English print of the same work we read: "The soil except in the fertile valleys is better adapted to pasturage than culture. The winters are long and cold, so that in the mountainous regions mercury sometimes freezes."

Truly these are not inviting or encouraging conditions; still they are better than those of the country where the hymn says, "Every prospect pleases and only man is vile." It is a notion of mine that the greatest obstacles to success in any business are to be found in the men who follow it. Cromwell said, "Trust in God, but keep your powder dry." Napoleon, "the man of destiny," as he was sometimes called, said that "Providence was on the side of the heaviest artillery," and there is an old adage, "Providence helps him that helps himself." These are the principal texts in my gospel of success, as well in farming as in war or commerce.

The early settlers of New Hampshire were all farmers. They were a stalwart, hardy race, both in mind and body. They feared not a contest with misguided men any more than they did with the forests that covered the soil they desired to subdue and make into fertile farms. They, like the settlers in Massachusetts, came from the old country to their new homes, with wives and children, with their few household goods and

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fewer cattle, risking danger from savage foes and starvation in a new country. They did not whine and growl about hard times and every time they met endeavor to excel each other in an effort to prove that farming did not pay, but boldly facing the situation, determined to make it pay. They made a success. With almost superhuman energy, they removed the forests; made farms; built homes, churches, schoolhouses, villages and cities; and for more than two hundred years grew in agricultural prosperity as well as in population. In the colonial days there were no manufacturing centers. Great Britain not only discouraged manufacturing, but by law forbade the people to engage in such pursuits.

It was the farming population which settled New Hampshire, that preserved it from the terrible dangers of the early days, that, in connection with a like population in the other colonies, won the independence of the nation. Conditions of wealth and population have wonderfully changed. The change in modes of living and methods of business has been equally great. Then the necessities of the farmers' family were supplied by food that their own soil produced, by clothing made by the household from wool and flax grown on the farm. The times were hard then, and no doubt those men contrasted their condition with that of the merchants and professional men of the old country. The burdens of private, municipal, state, and national debt brought upon them by war were oppressive. Turbulent spirits planned rebellion that they might escape the load of debt and taxation, but the patriotism of the farmers triumphed. Peace and prosperity came again. The fathers of the republic wisely encouraged manufactures, that the people of the country might cease to depend on other nations.

The war of 1812 found the country much advanced both in manufactures and commerce, but the nation was still an agricultural one. The stagnation of business caused by the waste and expenditure of war again brought on hard times. Again patience, patriotism, and perseverance triumphed and prosperity followed. Unexampled growth in population, arts, and

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manufactures attended that prosperity. The War of the Rebellion came, and has been followed by another era of hard times for the farmer. We cannot say that the farmers of to-day are actually in a worse condition than were their fathers a generation ago. Relatively, they may be, for other kinds of business have outstripped agriculture in wealth-getting, and those who follow other callings have established the standards of living. The luxuries afforded only by the rich of fifty years ago are now the necessities of the poor. The style of living that the bulk of the community can to-day afford, is too costly for the income of the average farmer. This is not as it should be, but is easily accounted for. Population has wonderfully increased. Cities and manufacturing villages have grown up by every harbor and along all our streams, until, in place of the few farmers of the early days, New Hampshire now has a population of 376,000, of which perhaps 30,000 are farmers. This population, with that of Massachusetts (as convenient to you as your own), consumes enormous quantities of farm products. But prices do not increase. On the contrary, they average lower than formerly, because the supply of staple farm products has more than kept pace with the demand. The policy of the government has encouraged the settlement of vast areas of new land by emigrants from Europe. In the last ten years more than 2,000,000 workers in agriculture have been added to the 7,000,000 previously employed in the business. This new domain tilled by this large army of agriculturists has produced vast amounts of grain and meat out of all proportion to the number of laborers employed. Improved agricultural machinery fitted for the level land and mellow soil of the Western prairies has enabled one man to do the work that formerly required from ten to thirty men.

A young man of my acquaintance with one yoke of oxen, pulverizer, seed drill, and binder, by changing work with his neighbors in stacking and threshing time, raised and marketed one hundred acres of wheat and oats without hiring any help except the operator of the machine that threshed his grain. He had no family, and while accomplishing this wonderful

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amount of work he lived in a board shanty cooking his own food, "batching it," as he called it. He saved very little money from the year's work, notwithstanding the small expense account. He delivered his grain at the railroad station several miles from his farm. The station was far from the great markets of the country, and freights and speculators absorbed most of the value of the grain, the price received being less than forty cents per bushel for wheat. The product of his one hundred acres came East in the form of flour and feed along with the product of other millions of acres of corn, wheat, oats, and meat that was raised in a similar manner by other new settlers. It was all sold in competition with the products of farms east of the Mississippi. Products raised by men with families that needed and must have homes and home comforts, schools for the children, and all the et cetera of civilization. This unhealthy (I had almost said unholy) competition has so glutted the markets of this country and the world, that the price to be obtained for staple farm products will not enable the family of the Eastern farmer producing them to live as well as the family of the mechanic and wage earner.

Our law makers at Washington seem to forget that a prosperous agriculture is something more than the production of a vast amount of wheat and corn and meat. They are talking now of expensive experiments in irrigation, proposing to expend government money raised by taxation to encourage still more of this ruinous competition with the very men who pay the taxes. This suicidal policy should be stopped at once. It has been ignorantly or thoughtlessly followed for years. The result is over-production and unremunerative prices. It will be time enough to expend government money in irrigation experiments when the demand for agricultural products overtakes the supply, and prices have at least begun to approach a point where the producer can prosper as well as the middle man and the consumer. This foolish and ruinous policy has already caused enormous waste of the heritage of fertility stored up in the virgin soil of our Western prairies by the

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Great Father for future generations. But whether our rulers will be wise or not, nature will soon assert herself. The fertile lands have been largely occupied and are being rapidly overrun. Time is sure to bring about an equilibrium between supply and demand, and that condition is not so far away as we may imagine. Already the relative increase in population and the supply of staple food products is bringing this country near to the time when there will be no surplus for export. With all the enormous production of the last twenty years, we are now exporting only ten per cent of the products of our farms, or six per cent exclusive of cotton. We have, say, 65,000,000 people; were population to-day increased six per cent or to 69,000,000, we should use at home all our boasted export of food products.

An author in the November "Forum" calculates from past experience the probable future increase of food products and population, and concludes, that in 1895 the population will reach 72,000,000; and that, with the same amount of food products consumed per capita as is now required, production and consumption will just balance; and that the entire food product of our farms will then be absorbed by our own population.

Whether his calculation prove correct or not, it is perfectly evident that the population that produces no food is increasing much more rapidly than the part engaged in agriculture. In 1790 only 3.3 per cent of our population resided in cities and towns of over 8,000 inhabitants; in 1840, 8.5 per cent were in towns of that size; in 1850, 12.5 per cent; in 1860, 16.1 per cent; in 1870, 20.9 per cent; in 1880, 22.5 per cent; and the census of 1890 will show that at least 25 per cent of our people live in cities or towns of over 8,000 inhabitants.

And to these must be added the vast numbers who live in smaller towns and villages and follow other business than agriculture or none at all. All the increase in population in the older States in the last ten years has been in the cities. The same relative increase of non-agricultural population is going on in all civilized countries. The cities of Europe are grow-

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ing almost as rapidly as those of our own country. These facts indicate the near approach of the time when a home market for all American products will be assured, and from that time on, with the same relative increase in population and agricultural products, the demand will increase prices as well as stimulate production and bring the producer into a much more independent position. But meantime the farmer must live and should live well — should live as all free and intelligent American citizens ought to be able to live. How can it be done? Surely not by following the paths our fathers trod. The early settlers prospered by raising their own corn, flour, meat, and vegetables, but they also made their own sugar, raised the wool and flax for the family wardrobe, and the cloth was made at home by the members of the family. The village tanner and shoemaker took the beef hides of the farmer and made the harness and shoes needed, receiving payment for his labor in products of the farm. The wagons and farm tools were made by the neighborhood mechanic, and payment was made for them in what the farmer had to sell. The doctor and minister were paid in the same manner. The best of help was plenty and cheap, and was furnished by the sons and daughters from the large families of neighboring farmers. Such was the condition of our farmers fifty years ago. Now all is changed. Help is scarce and inefficient and commands high wages; the staple farm products are plenty and cheap; but most of the great army of non-producers to be fed, enjoy a liberal income or earn high wages. The summer tourist and summer boarders are certainly of this class. They are willing to spend that income for what they want. They want the best that can be produced. They want it just when they want it and in the most inviting condition. They want the luxuries of life — the finest butter, purest cream, the richest milk, the freshest and nicest vegetables, fruits, and flowers in their season and out of season; and the man who brings them the most desirable products and in the nicest condition, and brings them just when they are wanted, gets a good price and makes a profit. Enterprise, industry, push, business ability will suc-

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ceed. Farming is like all other business. It is the man that commands success, not the business that brings it. I will not try to prove that the farmers are prosperous, though much might be said of the peculiar advantages of farm life for both sexes and all ages.

Happy homes in the country which some one has said "God made," might be contrasted with those of the city that the same author asserted were made by man. I will content myself with a few examples of prosperity among agriculturalists who exhibited the same traits and followed out the same business principles that have brought large success to men in other callings.

The business of dairying is, and must continue to be, the main dependence of owners of farms at a distance from market. The low price of beef and pork at present prevailing is a serious drawback to this business. The cows must finally go for beef and the skim-milk to a certain extent be used for the growth of pigs. But the redeeming feature of the dairy business is the large amount of valuable fertilizer furnished as a waste product. Thereby the farmer is enabled to increase the fertility of his farm without the outlay of cash for manure. Professor Roberts of the Cornell University Agricultural Experiment Station said at the last public winter meeting of the Massachusetts State Board of Agriculture: "Some six or seven years ago I sampled every load of manure that went out of our covered barnyard. I found we had produced in our barnyards upwards of $1,600 worth of potash, phosphoric acid, and nitrogen computed at ordinary prices. This so astounded me that I dared not publish it and so the next winter I took particular pains to count all the animals, to estimate very carefully the amount of food they consumed and to sample again, and weigh every load of manure that went out of the covered barnyard, and, lo and behold, I found the results of the winter before verified. There were about forty-five head of cattle, eighteen or twenty horses, and so on. And don't forget this if you forget all the rest, that with an ordinary ration and an ordinary animal with ordinary

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prices the manure produced by an animal is worth one half the cost of the food fed to it." Other chemists have by analysis proved that the value of the excrement of a well fed cow for the winter feeding season of 191 days is worth, at market prices of commercial fertilizers, $24.88. Dr. Goessmann of the Massachusetts Agricultural Experiment Station assures me that these elements found in stable manure are in the best form for plant food and are consequently worth as much as these same elements are in the highest priced commercial fertilizers. Dr. Goessmann has also proved by practical experiment as well as by chemical analysis that skim-milk is worth for feeding purposes (making pork at 5½ cents per pound) 1.9 cents per gallon. While Professor Cooke of the Vermont Agricultural Experiment Station by his experiments has proved that a gallon of skim-milk has in it the elements of nutrition which are worth 1.6 cents if reckoned in proportion to these same elements in grains at the market price of the grain. A cow that will give eight quarts of milk per day for 300 days, the minimum standard for a profitable cow, will furnish about 450 gallons of skim-milk worth at Prof. Cooke's price $7.50 if corn and oats are worth the average market price. They are above the average price this year and skim-milk is worth proportionately more. This 450 gallons of skim-milk will weigh 3,825 pounds. The chemist finds that there is in a ton of that skim-milk $2.53 worth of fertilizing elements, equal to one cent per gallon for skim-milk. Take out 20 per cent, which chemists tell us is dissipated by digestion, and we have $2.02 per ton as the amount of fertilizing elements remaining in the excrement after feeding a ton of skim-milk, or $3.82 for the 450 gallons furnished by the cow. So we have $24.88 as the value of the fertilizing elements in the winter excrements of a cow; $7.50 as the feeding value of the year's product of skim-milk; and $3.82 as the value of the fertilizing elements left after feeding the skim-milk,—or a total of $36.20 as the value of the waste products of a single cow used in butter making,—and this estimate makes no account of the manure of 174 days when the cow may run to grass. If the

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great hindrance to successful farming in New Hampshire is the lack of fertility in her soil, here then is the business that will enable the farmer to sell his products in a form that will not take along with them the elements of fertility of the farm. His farm may grow richer just in proportion to the increase of his sales. I believe the dairy business, if conducted with shrewdness in the choice and care of cows, special care to produce extra quality of product and to make a reputation for what is produced, will bring financial success at present prices whether conducted individually or on the coöperative plan.

I have in mind a man in western Massachusetts who has made a competency in this business. Coming into possession some twenty-five or thirty years ago of a run down farm with buildings worse run down than the land, he determined to bring up the farm and make money out of it at the same time. He believed that dairying was the business that would help him to accomplish it. The farm would then support in the way it had been carried on about eight cows and a team. Much of his land was suitable for the production of corn, oats, and grass. He began by increasing the number of his cows and trying by manuring and reseeding his meadows to raise the needed fodder. He was one of the first to adopt the silo. He has increased his business until all the fodder for one hundred head of neat stock and five horses is produced on that old run down farm. He is to-day milking about fifty cows, making two hundred and fifty to three hundred pounds of butter per week, most of which is sold at retail to customers in a manufacturing town ten miles away, at thirty-five cents per pound. He has built a good house for himself, another for his son, still another for his principal hired man. He has a little village of buildings, is out of debt, has accumulated money, is a member of the board of selectmen of his town, a member of the Board of Agriculture and also of the state Legislature. He is interested in all that is for the welfare of his town. He is a deacon of his church and has for three years been a Master of the local Grange. He is a successful

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man. But he has an immense amount of push. He has studied his business both in production and marketing. He has a fine herd of cows for butter making of his own breeding. He has learned to make No. 1 butter and take it to market in attractive shape, to be prompt and regular in supplying his customers, and so has been able to get the very best people in the town on his list. He personally attends to his butter making and marketing. In short, he has applied business principles to his business. If I mistake not you have not a few examples of this kind in New Hampshire.

I am acquainted with a man in a neighboring State, about fifty years of age who in early manhood engaged in mercantile affairs, followed the business for about ten years, and like a large proportion of those in the same business made a financial failure, losing all he had. He had a taste for gardening. His town with a manufacturing population of three thousand would, he thought, furnish a market for a limited quantity of fine vegetables at good prices. He leased a small piece of land and began business, working, studying, and experimenting, striving to produce a better product than that market had seen before. His business increased. He gradually worked into the greenhouse business, finding that the earliest and finest products brought the most profit. He has been in the new business about ten years. Last year he sold $16,000 worth of greenhouse products, mostly cucumbers, sending them to New York, Boston, and even to Chicago, having outgrown his home market. This man who worked hard enjoyed little and made financial failure in ten years of mercantile business, has enjoyed life, been successful and respected, helped his town by his agriculture, and, incidentally, in the last ten years accumulated not less than $30,000. He has not employed a large amount of help, but two sons interested in his work have been his strength and are settled with him in business, contented because prosperous.

Another, whose early manhood was spent in a manufactory, finding his health failing bought a farm of seventeen acres and went into small fruits and poultry and for several years has cleared $1,000 per annum.

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But he is keen for business, has learned his business, made a reputation for fine products, and has retail customers for all his goods in his town of eight thousand inhabitants. He pleases them and they pay him for it. I cannot refrain from giving you a leaf from the experience of a clerk in a store in one of our thriving towns. His close confinement at business for several years without opportunity for exercise in the open air had broken his health. His physician advised him to eat freely of celery. The market of his town did not furnish it so he felt compelled to raise it himself in a little plot of land attached to the tenement he rented. He began with a few plants, learning how to treat them by reading and experience, increasing the number from year to year soon having a surplus to sell. As his product was first class he readily found purchasers at good prices. For the past six years he has sold from his little plot of land, only nine hundred square feet, an average of $75 worth of celery. This is at the rate of $3,600 per acre. He has hired a little more land and is increasing the business. He still sticks to the store, having regained his health, but he attributes his recovery to his outdoor exercise in odd hours rather than to the medicinal effects of the celery. He is enthusiastic in the new work and is about leaving the store for gardening.

I might describe the condition of many others who have made marked success, accumulating money, living in affluence, respected and honored by the wealthy and educated. They have all followed the same principles of business though their products varied in kind. They have produced what was wanted, and when it was wanted, and the best of the kind that the market affords.

I must not withhold my most marked example of success. In the little State of Rhode Island a firm composed of father and son are engaged in market gardening extensively. The business was begun in a small way by the father more than thirty years ago with a small capital earned in working for others. It has grown year by year. The son grew up in the business, profiting by his father's experience and the experi-

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ence of others. To-day they have more than three acres under glass, selling last year as one item from the hot-beds and greenhouses $40,000 worth of lettuce to one firm in New York. They farm 500 acres, employ 100 men in winter and 175 in summer, 75 horses, 12 yoke of oxen, had last year 150 acres of cucumbers for pickles, 45 acres of green corn, 45 acres of peas, 35 acres of turnips, 12 acres of asparagus, 25 acres of spinach, 15 acres of tomatoes, 10 acres of horseradish, 5 acres of kale, 10 acres of onions for pickles, 8 acres of peppers, 8 acres of cauliflowers, besides large amounts of other fine garden products that I will not take your time to enumerate. His market is Boston, New York, and Chicago, as well as the near city of Providence. His pea vines, corn stover, and the hay he raises for rotation are sufficient to supply the fodder for his teams. He makes his own pickles and catsup, and prepares his own horseradish, markets the pickles by the barrel and half-barrel, bottles his catsup and horseradish, using between three and four thousand barrels of vinegar in the business. More than fifty thousand bushels of cucumbers, onions, peppers, tomatoes, and cauliflowers — all of his own raising — passed through his pickle vats the past year. This business began thirty years ago in a very small way, their whole product being then prepared in one little kettle on a cooking stove. He purchases five thousand cords of manure in Boston besides what he gets in Providence. The amount of their sales is something enormous, enabling them to live in opulence and enjoy the privileges and pleasures of the millionaire. This has all been accomplished by strict attention to business, always having an eye to the main chance. I need not say that their superior business ability has been assisted by unflagging industry, energy, and perseverance, and in the early days with their own manual labor and the strictest economy.

In the October bulletin of the Delaware Experiment Station is given an illustration of success following conformity to the necessary conditions. "A vineyard measuring 45,888 square feet of land has this season produced a crop

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which sold for $933.24. Of this amount $710.75 was left after harvesting, shipping, and commission expenses had been paid. This is equivalent to $674.30 per acre. It is admitted that good tillage, skillful tending, and generous feeding of vines was associated by the owner of this vineyard with extreme neatness in preparing the fruit for sale and with business ability in finding and holding a first-class market. All of these points, however, would have availed at most only one third of the above sum had this vineyard remained in 1889 and 1890 unprotected against the attack of the black-rot fungus." This vineyard was sprayed in 1889 and 1890 with a preparation recommended by the Experiment Station. He had a full crop while his neighbors, who through ignorance or lack of enterprise neglected the necessary precaution, had less than one third as much.

I might give you a leaf from the experience of the owner of an apple orchard. In the spring of 1888, the great apple year, he sprayed his orchard with Paris-green water. In August he thinned his fruit at small cost, picked his apples carefully and kept them till February, and got $2.25 per barrel while ordinary apples were a drug in the market.

I doubt not many will say that these are exceptional cases and will not apply to us. I must answer that no one can furnish capacity. The same opportunity awaits all alike. In this pushing, rushing age only a few in any calling will become eminently successful. You can count the Astors, Vanderbilts, and Goulds of this country upon your fingers. But successful men are numerous in all gradations. As I have before remarked, success depends upon the man rather than the business. This is as true in agriculture as in any other occupation. We must divest ourselves of the idea that a recipe can be given which will bring wealth to all who follow its directions. We can all learn something from the successes and failures of others but our own individuality must carve out success.

Select your specialty, learn your business, push it with energy, industry, skill, and perseverance, and you will succeed

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as those in other kinds of business prosper. We have seen what sort of citizens the farmers were who first settled this State. While our circumstances are radically different from theirs, their principles may well be taken as the pattern and guide of the farmers of to-day who are not only their successors but in many cases their lineal descendants. They made the good of the whole paramount to the good of the individual. Then the farmers were the State; now they are only a minority in all of the older States, but from their households come the men of influence who will shape the policy of the future in government, in professional life, in commerce, and in manufactures.

The successful men of to-day were the farmer boys of a few years since. Consequently, almost as large a responsibility devolves upon us farmers to-day as did upon our predecessors of two hundred years ago.

We have the early training of the future leaders of the nation. Statistics show that at least eighty per cent of the successful men in all callings were born on the farm or in the country. This seems to be the natural law. The country is the fountain from which the city draws its fresh blood to take the place of that worn out or deteriorated in the heated scramble for wealth and position. This is true of Massachusetts cities and New Hampshire towns. They must have this fresh vital force to save them from disaster. As they increase in population with wondrous strides they attract the worst as well as the best elements of society. The foreign population naturally settles in the cities. Nearly forty per cent of our German and more than forty-five per cent of our Irish population is found in fifty of the principal cities. A little less than one third of our population is foreign by birth or parentage. But sixty-three per cent of the population of Boston, eighty-eight per cent of that of New York, and ninety-six per cent of that of Chicago is of foreign birth or parentage.

The power of the saloon, of socialism, and of all other bad isms is in the cities. Here, dangerous men, the ignorant, the wicked congregate. Those with enormous wealth and

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the poorest of the poor. Here we find the aristocratic quarter with streets lined with the palaces of the millionaire, and the wards where thousands of the ignorant and depraved poor are crowded into a single square of dirty tenements. A New York judge not long since said, "There is a large class, I was about to say a majority, of the population of New York and Brooklyn who just live, and to whom the raising of two or more children means inevitably a boy for the penitentiary and a girl for the brothel." These classes are a menace to good government. Almost every man of them is a voter and they have also among them a class of unscrupulous politicians who by their influence control the voters and carry whole wards in their pockets. They live off of politics. Their hold is through the saloons and other disreputable places. The farm and country village must furnish the material to control or neutralize this taint and stay the power of this avalanche of destruction. This growth of the cities is to continue. Here lies the duty and the opportunity of the farmer to do the work of the good citizen. In his home must be trained the men and women who will hold the future destinies of this great republic. Let no narrow, selfish views control our action. Let the disinterested patriotism of our ancestors be our pattern and guide. Our duty is to the whole body politic. The influence of the Pilgrims and Puritans made the New England States what they are in education, morality, and business prosperity, and no where do their characteristics yet remain so nearly in their original purity as in the towns of New England. Our ancestors were quick to repel invasion of their rights by their French and Dutch neighbors, and to rebel against unfair and oppressive taxes levied by the king and parliament of Great Britain. They were ready to risk life and to sacrifice property for the right. So we should stand firmly for our rights as agriculturists demanding fair play and the same fostering care of our industry that is granted to other branches of business, remembering to require not only justice for ourselves but for all, whether rich or poor, professional men, producer or con-

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sumer, merchant or customer, manufacturer or operative. Our business is an honest business and we should not require special favors for ourselves at the expense of others but should peremptorily demand fair play. Our quiet life and rural situation has led the bustling and pushing masses of the cities to overlook our interests. The ease with which they are enabled to obtain the needed supply of agricultural products at low prices has led these same people to forget in some measure the obligation of the state and nation to the rural population. Let us see to it that we are not overlooked in the future. While legislation cannot make crops grow nor prices appreciate, it can in many ways, indirectly, help agriculture. It is but just that every man should be compelled to bear his fair share of the burdens of government. The escape of credit property from taxation or its being taxed at a less rate than real or visible personal property, the under-valuation of city and village property, the over-valuation of farm property, are grievances that should be remedied, and farmers are bound to take all legal measures to right the wrong. It is possible that it would be best to go further and tax incomes. The man whose skill or natural faculty enables him to earn $3,000 per year can better afford a tax on $3,000 than the owner of $3,000 worth of real estate. Farmers have a vital interest in these matters, not as farmers but as citizens, just such an interest as every man has who rents or owns a home or manufactory. The farmer has a right to legal protection from unfair competition by imitation of his products and should insist upon it. But the consumer has a right to be protected from having the imitation palmed off on him as genuine. The manufacture and sale of adulterated or imitation products as pure and genuine is in all cases a swindle, and the farmer should be prompt to exert his influence and cast his vote for honesty in business, not only for his own protection but because it is right and honest. It is true that a State cannot be permanently prosperous without a prosperous agriculture and a thriving rural population, and it behooves the people of manufacturing and commercial centres

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to foster agriculture. But it no less behooves the farmers to see to it that full justice is accorded to the merchant, the manufacturer, the professional man, and the wage earner. The farmer should be to all intents and purposes a good citizen, earnest for the good of the nation, his state, and his town. To this end he should be well informed on all matters of politics, should attend the primary political meetings of his party and should never fail of his duty at the polls. He should insist on economy in the appropriation and expenditure of public money. But he should remember that economy is not stinginess but the judicious expenditure of money. He should remember, that good schools are vital to the future welfare of the State, that money judiciously expended for good roads is a first-class investment for every community, and that a low rate of taxation is not always to be struggled for. The farmers living on and owning the land always form the conservative force of a community. They should stand between the schemes of labor cranks and the greed of labor employers, and see that strict justice is meted out to all by laws properly restraining the ill-considered or greedy schemes of all classes. The corporation, properly managed and restrained, is a useful adjunct to the business of the country and should have justice at our hands, but their plans being the schemes of soulless bodies should be carefully scanned and the legislation asked for should be closely investigated.

The New Hampshire system of representation by towns in the Legislature gives the farmers larger opportunities and greater responsibilities in matters of legislation than the farmers of many other States can have. See to it, my friends, that you discharge your political duties so that your fellow citizens who dwell in the centres of population shall have no cause to charge ignorance, bigotry, intemperance or class legislation to the rural population of New Hampshire. The farmer should have malice towards none but should insist on exact justice to all; should deal with public questions in the same spirit that actuated the fathers of this good old commonwealth. Thus, and thus only, can we retain the respect

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and coöperation of those in other callings in our schemes for our own advancement and for the public good.

MR. CURTIS: According to that, the waste product would pay to keep a cow?

MR. SESSIONS: Yes, sir, where hay is not worth any more than it is in rural districts that is true. But if you pin a man down and ask him how it can be made profitable, my answer would be that I cannot give a man brains to get that out of it. There is a way to do it in my opinion. At any rate you must have the waste product if you intend to keep up your farm and continue to use it. If your idea is merely to sell your farm little by little, you would have no use for the manure, perhaps.

MR. PHILBRICK: We are told that it is impossible to get only a certain per cent of the value of this waste product.

MR. SESSIONS: I think with the proper appliances we can.

QUESTION: How much money did he have when he started?

MR. SESSIONS: He paid for the whole thing. He didn't have any capital to start with except his own hands.

THE PRESIDENT: The next subject will be "Our New Hampshire Forests" by Hon. Joseph B. Walker, who will now address you upon that subject.

OUR NEW HAMPSHIRE FORESTS.

BY HON. J. B. WALKER, CONCORD, N. H.

New Hampshire has four principal natural resources:

1. Her Soil.
2. Her Water-Power.
3. Her Invigorating Climate and Scenery.
4. Her Forests.

Just in proportion as she wisely develops these, she increases her wealth and enhances her importance in the sisterhood of American States. The talk assigned to this hour is to be upon our forests; and wisely, for of these and of their proper management there is less known and said than of our soil, our water-power, or our scenery.

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OUR FOREST AREA.

I took particular pains, some six years ago, to ascertain the existing forest area of this State. From a careful study of the census returns of 1880, I reached the conclusion that something over one half (nearly fifty-nine per cent) of its entire surface was in forest. And if we look back, we shall also find that this proportion has never been much, if any, less.

This fact, as important as it may be imposing, very naturally raises the question, How happens it that the people of New Hampshire have, for so long time, left so much of their State in its natural wildness and reduced so small a portion of it to cultivation? The answer is easily found. It has been impossible for them to do otherwise than as they have done. The rugged sides of our mountains and the bowlder strewn surfaces of very many of our lesser elevations have never submitted to any plow but that of the glacier or the avalanche, and, in all probability, never will. Agriculture, in the future as in the past, must be restricted to our valleys and to the smoother surfaces of our hills. Of the nearly six millions of acres which comprise our State's area, less than one million are in tillage and only a million and a quarter in pasture. Some three and a half millions are in forest. And strange, perhaps, to say, for the last few decades our wooded area has been increasing. Wherever one goes, he will see repeated evidences of this fact.*

If now, any one shall ask, "What do these striking facts mean?" I can simply but confidently say, that they mean that the Supreme Maker of New Hampshire has intended the larger portion of it for the perpetual growth of wood and timber, and that it is financially impracticable to devote this to any other purpose. To attempt it is simply to contend with the Almighty. It becomes us, therefore, to accept the situation. By so doing we shall not only follow our destiny but attain to our highest prosperity.

*It must not be forgotten that, although our forest area is constantly increasing, our timber supply is very fast decreasing. Much of our present forest land will not be in fit condition for the axe for twenty years at least.

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INDUSTRIAL PURSUITS DETERMINED BY GEOLOGY.

Geology largely determines the industrial pursuits of a people. An examination of the different sections of the United States where unlike occupations prevail, incontrovertibly establishes this proposition. Great iron industries have been founded in Pennsylvania, and other States of like geological character, because great deposits of coal and iron have attracted them. Cotton culture is found in what is known as the cotton belt because the soil and climate favor its presence there. Similar statements apply to the corn and other areas, which together constitute so much of our national domain. The New England States are alike in many respects, geologically, and hence their industries are greatly similar. The great drift formations, almost everywhere present in this State, have made wood and timber the great staple of New Hampshire. This is geologic destiny and we can resist only to our hurt.

LUMBERING ONE OF OUR EARLIEST INDUSTRIES.

Next to a limited traffic with the Indians, and to fishing, lumbering was the earliest industry established in this State. At the time of its settlement, its whole face was hidden by primeval forests, broken only by limited water areas and an occasional mountain summit towering in rocky barrenness above the reach of arboreal vegetation.

As population crept by degrees up the banks of the Piscataqua and its branches, much of it sought employment by converting the stately trees which lined them into timber, boards, plank, pipe-staves, and ships. The latter, freighted with fish and forest products, were quite often sent to the West Indies, where more or less of their cargoes were exchanged for the products of those islands, and thence to Europe, where both vessels and cargoes were sold. With the proceeds of these, New Hampshire merchants paid for the imports with which they supplied the wants of the home population.

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Twenty-one of the thirty-six products of New Hampshire exported to foreign countries ten years before the close of the last century, were those of the forest, as appears from the following—

"*Table of Exportation of lumber from the Port of Pascataqua, from October* 1, 1789, *to October* 1, 1791.

Articles Exported.	To Europe.	W.Ind.	N. Sco.	Africa.	Tot.
1,000 feet of Pine Boards	6,247	11,622	96	69	18,034
Do. feet of Oak Plank	378	26	.....	.....	404
Do. Staves and Heading	1,317	1,608	44	.....	2,969
Do. Clapboards	2	19	.....	.....	21
Do. Shingles	2,689	.....	.....	.....	2,689
Do. Hoops	.....	79¼	7	.....	86¼
Feet of oar rafters	47,000	950	.....	.....	47,950
Tons of pine timber	88½	86	.....	.....	174½
Do. oak timber	251	20	.....	.....	271
Frames of houses	.....	12	.....	.....	12
Pine masts	41	4	.....	.....	45
Spruce spars	13	72	.....	.....	85
Shook hogsheads	.....	2,079	.....	.....	2,079
Waggons	.....	2	.....	.....	2
Pairs of cart wheels	.....	14	.....	.....	14
Sets of yokes and bows	.....	28	.....	.....	28
Boats	.....	30	.....	.....	30
Handspikes	80	.....	.....	.....	80
Quintals of dry fish	250	26,207	.....	.....	26,457
Barrels of pickled fish	.....	501	.....	.....	501
Do. whale oil	.....	120	.....	.....	120
Do. tar	1,613	60	.....	.....	1,673
Casks of flax seed	1,798	2,775	1	.....	1,798
Barrels of beef	.....	2,775	2	.....	2,777
Do. pork	.....	9	1	.....	10
Do. rice	.....	.....	.....	2	2
Bushels of Indian corn	.....	391	.....	2,000	2,391
Oxen and cows	.....	577	33	.....	610
Horses	.....	207	2	.....	209
Sheep	.....	261	229	.....	496
Gallons of New England rum	.....	.....	150	1,449	1,599
Do. Madeira wine	.....	845	.....	.....	845
Thousands of bricks	.....	129	.....	.....	129
Tons of potash	88½	.....	.....	.....	88½
Do. pearl ash	30½	.....	.....	.....	30½
Boxes of candles	.....	28	.....	.....	28

Total value of exportation for two years, 296,839 dollars, 51 cents."

Belknap's Hist. N. H., vol. 3, *p.* 219.

The following table of the imports at Pascataqua (Portsmouth) for the same time, gives a fair idea of the articles received in return for those set forth above:

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"Articles Imported from Europe.		W. Indies.	Nova Scotia.	Total.
Gallons of rum		138,911	.....	138,911
Ditto gin		22½	.....	22½
Ditto molasses		270,785	.....	270,785
Ditto wine from Madeira		.....	.....	4,721
Ditto porter	457	.....	.....	457
Lbs. of unrefined sugar		546,648	.....	546,648
Ditto loaf sugar		.....	77	77
Ditto coffee		68,633	.....	68,633
Ditto cotton		17,564	.....	17,564
Ditto cocoa		27,944	.....	27,944
Ditto cheese	1,056	.....	.....	1,056
Ditto tea	2,696	86	.....	2,782
Ditto twine	2,204	.....	.....	2,204
Ditto nails	16,890	.....	.....	16,890
Hundreds of cordage	17.67	.....	.....	17.67
Ditto hemp	940.00	.....	.....	940.00
Bushels of salt	(part)	(part)	.....	98,336
Ditto sea coal	3,131	.....	.....	3,131
Lbs. of steel unwrought	16,527	.....	.....	16,527
Ditto bar and sheet lead	4,336	.....	.....	4,336
Grindstones		.....	A few, not ascertained."	.....

Belknap's Hist. N. Hamp., vol. 3, p. 220.

For a century and a half the people of New Hampshire relied upon these two industries, supplemented by that of a slowly growing agriculture, for their support. Nor was the value of the forest then appreciated by those only who were thus dependent upon it. The king quite early learned the fitness of its stately pines for masts and spars for his royal navy and claimed them for his own.* To make sure of them, he appointed officers whose duty it was to affix to all such trees, not previously sold, the mark of the broad arrow, in token of their reservation for this purpose

*Dr. Belknap said, in 1792, that, "The white pine of the forest is the strongest and most durable timber which America affords for masts. It is often advanced by Europeans, that the pines of Norway exceed those of America in strength. This is acknowledged to be true whilst the Norway wood retains its natural juices; but these being soon exhausted by the heat and dryness of the air, leave the wood less firm, and a decay commences much sooner than in the white pine of America. The Norway pine begins to decay in five or six years; but the American, with proper care to defend the mast head from moisture, will last unimpaired for twenty years."

"The British navy for eighty years before the late war, received its masts wholly from America; which is a proof that our pines are preferable to those of Norway."

Belknap's Hist. N. Hamp., vol. 3, p. 210.

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and of the severe penalties attaching to an unauthorized cutting of them. Parliament and the provincial assembly both enacted laws for the protection of the forests. On the 10th day of May, 1708, the general assembly imposed a fine of one hundred pounds sterling upon any person "who shall presume to cut or destroy any white pine trees, or mast trees, not being the particular property of any private person, above the growth of twenty-four inches in diameter at twelve inches from the earth, being fit to make masts for her majesty's royal navy."

The cutting of more than one box or notch in a pitch pine tree,* for the collection of pitch for the manufacture of turpentine, was forbidden by a provincial statute, and a penalty of five pounds was incurred by a violation of the same. Tar, boards, plank, pipe-staves, and other forest commodities were made receivable in payment of public taxes and the prices of the same were fixed by the general assembly.

Indeed, for many years, the most lucrative public office in the province was that of surveyor-general of the king's woods. It was a crown office, and when Benning Wentworth was made provincial governor, he was also made surveyor-general of the forests. To the latter office was attached a salary of eight hundred pounds sterling, which much exceeded, in both security and amount, the uncertain sums tardily and reluctantly doled out to him by the general assembly, in compensation for his services as governor. To secure a resignation of this office in Wentworth's favor,

* Fifty years ago, heavy growths of pitch pine trees (*Pinus Rigida*) were to be found upon the sand formations along some of the rivers of the State. Specimens were not uncommon which compared quite favorably with the hard pines (*Pinus Australis*) of the South. But such forests have mostly disappeared. Those pine trees have been cut for timber and the inferior ones for wood, much of which has been consumed by locomotive engines.

Where forests of this wood have been removed, they have shown a disposition to return, with a similar growth; but, in many cases, particularly in the vicinity of large towns, fires have destroyed the second growth before they had attained a size sufficient to endure their ravages. This remark applies with particular force to the hard pine woods in the vicinity of Concord and Manchester. The Dark Plain, so well known to the people of the former city, half a century ago, is to be found now only in history.

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its incumbent, Dunbar, was paid the large sum of two thousand pounds.

While in the early days of the province, lumbering was extensively pursued, it rarely enriched those who engaged in it. As the forests retreated and the country developed, agriculture became more and more the support of the people. Lumbering, imperfectly organized and carried on by persons possessed of inadequate means only, became less and less remunerative. As a business it was but imperfectly organized. Its returns were but moderate at best. They were also slow, except in cases where advances were made by factors and dearly paid for.*

Some who pursued lumbering also followed farming. But the two pursuits did not harmonize in their requirements. Those of the former interfered seriously with the work of the fields, and it was found, ere long, that a man could not carry on both to his greatest profit. In most cases work in the woods gave way to that of the farm; and at length, agriculture became the leading pursuit of our people.

Indeed, we may say generally that lumbering has never been a lucrative business in New Hampshire until recently, when improved facilities of transportation, systematic management, and the free use of capital have made it so.

FOREST MANAGEMENT.

How then shall we of to-day manage our forests? This is the question. All the forests of New Hampshire are now

†Dr. Belknap said, an hundred years ago, that the lumber business did not usually enrich those who pursued it; but, rather, that "Those who make the getting of lumber their principal business generally work hard for little profit. This kind of employment interferes too much with husbandry. The best season for sawing logs is the spring, when the rivers are high; this is also the time for ploughing and planting. He who works in the sawmill at that time, must buy his bread and clothing, and the hay for his cattle, with his lumber; and he generally anticipates the profit of his labor. Long credit is a disadvantage to him; and the too free indulgence in spirituous liquor, to which this class of people are much addicted, hurts their health, their morals, and their interests. They are always in debt and frequently at law. Their families are ill provided with necessaries, and their children are without education or morals."

Belknap's Hist. N. Hamp., vol. 3, pp. 261 and 262.

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the property of private individuals.* More easily asked than answered. Two systems of forest management which have long prevailed in this State are still in vogue. Of forestry as seen in Europe we have but little, if any, as yet. Thus far, our plantings of forest trees have been made by nature only. Hand planting has been unprofitable and unnecessary. That we may adopt it, by and by, is very possible and perhaps probable. But I doubt if the time is near. Spontaniety of seeding and the high price of labor both oppose its introduction.

*It appears by the record of three deeds in the office of the secretary of state that, the State sold all its interest in its forest lands in 1867. The conveyance was made by three different instruments.

By the first, dated October 17, 1867, for the sum of $500, it sold "all and singular, the lands belonging to the State of New Hampshire, lying and being within a circular area six miles in diameter, of which the centre is the centre of the Tip-Top House on the summit of Mount Washington, in the County of Coös in said State, and extending three miles in any direction from the centre of said Tip-Top House, all situate in the County of Coös aforesaid, and estimated to be two thousand acres in the whole, more or less, meaning and intending hereby to transfer and assign to said Aurin M. Chase, his heirs and assigns forever, all the right, title, and interest of the State of New Hampshire in and unto any and all lands within the limits of the aforesaid circle, however the same may be located and bounded and whatever the number of acres."

By the second, dated October 27, 1867, for the sum of $20,500, it sold "all and singular, the lands belonging to said State of New Hampshire, situate and lying within the limits of the town of Pittsburg, in the County of Coös in said State of New Hampshire, however located and bounded, estimated at seventy thousand acres, more or less, excepting and reserving, therefrom to each of two actual *bona fide* settlers now supposed to be resident upon said lands, if they or either of them shall prove to be so actually resident thereon, so much of said lands as each of said settlers or either of them may have actually improved or inclosed, not exceeding one hundred acres in all to each or either of said actual settlers."

By the third, dated November 5, 1867, for the sum of $4,000, it sold "all and singular, the lands belonging to the State of New Hampshire or in which the said State of New Hampshire has or might have any right, title, interest, or claim in any way whatever, situate and lying within the limits of the Counties of Grafton, Carroll, and Coös in said State of New Hampshire, however located and bounded, estimated at one hundred thousand acres, more or less, meaning and intending hereby to assign and convey to said Woods and Smith, their heirs and assigns forever, all and singular the lands in said Counties of Grafton, Carroll, and Coös, to which the said State of New Hampshire has or might have any claim or title in any way whatever, excepting and reserving from said grants the arsenal lot in Lancaster, in the County of Coös, and any given house lot owned by the State in said Counties of Grafton, Carroll, and Coös, aforesaid."

If the areas as given above are correct, the State received for these lands the very inadequate sum of 14 23-43 cents per acre.

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The First System. — Where wood is of value and its production is more profitable than timber, clean cutting has been practiced; sometimes at the ends of stated periods, but usually with no regularity. This course involves the denudation of the land and the removal of its entire growth. This is quite often succeeded by another of a different character, particularly if the one removed be an evergreen growth. The change is less frequent if the trees removed are of a deciduous character, as many of these, like the chestnut, the red and white maples, and some of the birches, sprout at once from the stumps of their predecessors. Hard pines also, particularly on sandy plains where deciduous trees do not flourish, are quite often followed by others of the same species. Where a spruce growth is removed it is rarely followed, if ever, by another of the same kind; a matter of no small interest to parties interested in the preservation of the great forest reservoirs of the State, upon which the manufacturing streams so largely depend for water.*

Lands possessing favorable exposures, fairly dry and of average fertility, will occasionally yield a crop of thirty or thirty-five cords of wood per acre at the end of each succeeding period of as many years. But judging from personal experience and observation, I deem such a crop above the general average, which usually does not exceed three fourths of a cord of growth per acre per annum.

This system of management is the simplest of any, and where wood is valuable, as in the vicinity of large towns, is as profitable. It involves only the cutting and marketing, at stated times, of the growths of stated sections.

*The volumes of our streams are less equable than formerly. In summer they are greatly reduced. Many brooks whose flow was once perennial are no longer to be found for one half of the year. This fact is due to the total or partial denudation of the land from which they flow. So serious an evil had this become, some thirty or forty years ago, that the manufacturing companies upon the lower part of the Merrimack, were forced to construct vast storage reservoirs, at great expense, which can be drawn upon as water is wanted. Winnepesaukee lake and Long pond are two of these. Total denudation at the source of our streams, would convert them into destructive torrents in spring and their channels into dry ditches for the rest of the year.

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The Second System. — In localities where only timber is of much value, as is the case in many parts of the State, the practice has prevailed of cutting none but trees of selected varieties, and those only which were of sizes above a minimum standard. Until recently, this custom has been universal in the great lumber districts. But the introduction of portable saw mills, the extention of railroads into the woods,* other improved facilities of transportation, and a call for smaller lumber have led, in many instances, to complete denudation in very remote localities. In individual instances, this course may have best subserved the interest of the operator; but as a general thing, and particularly when that of the public is regarded, the wisdom of this practice is doubtful, to say the least, and for several reasons:

1. A denuded surface dries quickly, and, if a fire gets well started upon it, its arrest is difficult if not impossible. This sometimes destroys not only the ground's covering of leaves and other vegetable debris, but burns the underlying matting of roots and ligneous matter, which often composes the only soil of large areas, leaving bare the barren underlying rock. After such a burning, a new growth may never start, or, if it does, it will be found that portions only of the tract have been reforested. The summit of Kearsarge is said to have once been covered with trees, but it is bare now and, in all human probability, must forever remain so.†

*Some half a dozen short railroads, in the upper part of the State, have been built into the woods by lumbermen for the transportation of logs. Experience shows that in time some or all of these will be changed to general passenger and freight roads. The Whitefield and Jefferson railroad has already been converted to such a purpose. The Zealand Valley, the Sawyer River, and the Kilkenny railroads are as yet used for the transportation of lumbermen's supplies and lumber only.

†Greater injury to the forests and scenery of the State is to be apprehended from fires than from any other agency. This fact is due, in part, to the carelessness of camping parties, and in part, to a general indifference to their ravages. While the burning of a building, worth an hundred dollars, will at once engage their attention and bring together all persons in its vicinity, the destruction by fire of a distant timber lot, worth ten thousand dollars, will awaken but slight interest in their minds. It is important, therefore, that the owners of such property should so manage it as to reduce its exposure to fires as much as possible; and its injury, in case of burning, to a minimum. This

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If there is any sight entirely disheartening, it is that of one of these fire denuded tracts, from which everything has been swept clean, down to the underlying rocks. Any one who has visited the Zealand valley within the last five years can attest the truth of this assertion. For seven miles up the valley, the fire swept resistless across it from crest line to crest line of the mountains which wall it in. Neither bird, nor beast, nor man, nor tree could endure its arid breath and devouring flame. The river only and the naked ledges, with a few small sections too damp to burn, escaped destruction. As one now looks upon the two towering sentinels of fire-blasted rock which mark the opening of this valley, there blazes into his mind, in letters of living fire, the terrible inscription which Dante in his Divine Comedy placed over the entrance arch to hell, —

"All hope abandon ye who enter here."

2. In case a denuded tract escapes the fire and a new growth springs up from accidental seedings or from the stumps of trees removed, many years must elapse before it has matured and is ready for the axe. How many, will of course depend upon the character of the soil, its exposure, and the variety of lumber sought. No paying crops of timber, however, can be harvested in such localities until the expiration of some forty or fifty years.*

can be best accomplished by keeping woodlands free of debris, and by dividing them into sections by roads or ditches; which, if kept open, will often confine any fires which may have been kindled to limited areas.

*Some persons may maintain that timber grows faster than I have indicated. The statement in the text is based, partly upon general observation, and partly upon actual measurements of fallen trees and counts of their annual rings of increase. As an instance of such measurements and enumerations, I cite the diameters, number of annual rings and average annual increase of forty white pine logs, twenty of chestnut, twenty of red oak, and five of hemlock, all of which grew upon lands in the vicinity of Concord:

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Forty White Pine Logs.

Diameters.	No. rings.	Average annual increase.	Diameters.	No. rings.	Average annual increase.
19 inches.	75	.25 in. per an'm.	425 inches.	1,713	5.00 in. per an'm.
22 "	72	.30 "	35 "	92	.38 "
24 "	73	.33 "	27 "	91	.30 "
20 "	82	.24 "	30 "	95	.32 "
21 "	83	.27 "	23 "	92	.25 "
19 "	89	.21 "	16 "	96	.17 "
20 "	90	.22 "	23 "	50	.46 "
19 "	80	.24 "	31 "	91	.34 "
14 "	87	.17 "	21 "	54	.40 "
25 "	90	.28 "	30 "	93	.32 "
12 "	80	.15 "	16 "	58	.24 "
22 "	93	.24 "	26 "	80	.30 "
23 "	92	.25 "	25 "	80	.30 "
22 "	91	.24 "	30 "	90	.33 "
23 "	86	.27 "	20 "	91	.22 "
27 "	90	.30 "	20 "	89	.23 "
23 "	94	.24 "	12 "	60	.20 "
30 "	86	.35 "	20 "	86	.21 "
17 "	89	.20 "	18 "	99	.18 "
23 "	91	.25 "	38 "	164	.23 "
			22 "	107	.22 "
425 inches.	1,713	5.00	908 inches.	3,471	10.60
			Av. diameters 22.70 in.	Av. no. rings. 86.77	Av. annual increase .265 inch.

Twenty Chestnut Logs.

Diameters.	No. rings.	Average annual increase.	Diameters.	No. rings.	Average annual increase.
			225 inches.	762	2.93 in. per an'm.
18 inches.	49	.37 in. per an'um.	19 "	65	.29 "
16 "	81	.20 "	16 "	70	.23 "
20 "	78	.26 "	20 "	75	.26 "
22 "	87	.25 "	23 "	93	.25 "
24 "	91	.26 "	21 "	97	.27 "
29 "	70	.33 "	17 "	64	.27 "
30 "	80	.38 "	25 "	72	.35 "
27 "	70	.38 "	25 "	71	.36 "
20 "	82	.24 "	14 "	61	.21 "
19 "	74	.26 "	23 "	70	.30 "
225 inches.	762	2.93	428 inches.	1,480	5.72
			Av. diameters 21.41 inches.	Av. no. rings 74.	Av. annual increase .286 inch.

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Twenty Red Oak Logs.

Diameters.	No. rings.	Average annual increase.	Diameters.	No. rings.	Average annual increase.
36 inches.	64	.56 in. per an'm.	176 inches.	753	2.52 in. per an'um.
25 "	69	.36 "	13 "	58	.19 "
11 "	35	.31 "	26 "	62	.42 "
18 "	115	.16 "	15 "	60	.25 "
16 "	110	.15 "	15 "	79	.19 "
13 "	100	.13 "	18 "	59	.30 "
19 "	65	.29 "	14 "	55	.25 "
11 "	61	.16 "	15 "	80	.19 "
12 "	70	.17 "	36 "	73	.48 "
15 "	64	.23 "	21 "	63	.33 "
			15 "	60	.25 "
176 inches.	753	2.52	364 inches.	1,402	5.37
			Av. diameters 18 inches.	Av. no. rings 70	Av. annual increase .27 inch.

Five Hemlock Logs.

Diameters.	No. rings.	Average annual increase.	Diameters.	No. rings.	Average annual increase.
24 inches.	68	.36 in. per an'm.	55 inches	195	.85 in. per an'm.
17 "	74	.23 "	13 "	53	.24 "
14 "	53	.26 "	18 "	140	.13 "
			.....	.....	.....
55 inches.	195	.85	86 inches.	388	1.22
			Av. diameters 17.20 in.	Av. no. rings 77.60	Av. annual increase .24 inch.

When the cutting is restricted to trees above a minimum diameter of ten or twelve inches, a small number only of the standing trees are removed; the soil continues shaded and moist; if fires are started, they are more easily extinguished; and although the remaining trees may be immature, they represent growths of from one to twenty or thirty years; for a new crop of which there must be waiting in case of entire denudation. A tree of the size of a goad stick measures little and is of slight value. But it has taken half a dozen years to produce it. It is the predecessor of a larger one, which, without this start, would never be, just as the boy precedes the youth, and the youth the man. The first sys-

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tem disregards this fact, wastes the introductory growth of several or even many years, for slight consideration, and starts anew on an unoccupied surface. The second, husbands with care all immature trees, removing only those which are ripe, and starting anew every twenty or thirty years with a crop half grown; just as the orange grower picks his mature fruit and waits patiently for that which is green to turn yellow.

A gentleman, who has had a long and extensive experience in lumbering upon the head waters of this State, recently told me that he pursued restricted cutting and realized a timber crop every twenty years.

Another, who has long pursued the same system in the town of Chatham, remarked some time since, that a certain addition to his timber lands which he thought of making, would enable him and his successors to cut upon their own land a million feet of logs annually and perpetually, inasmuch as his standing timber would grow that much every year. In neither case, could this be done under the system first mentioned.

Which of these two systems is to be preferred, I have, perhaps, already sufficiently indicated. The latter will probably be adopted when systematic management becomes general, for the value of wood is little likely to increase and timber culture only to be profitable.

The following calculation,* based upon the annual re-

*This calculation is but one of a score which might be cited as examples to show the profits to be derived from a well managed wood and timber lot. Results will vary much with the character and exposure of the grounds, the trees raised and the treatment which they receive.

Plantations of small timber, particularly of white pine, cut or thinned at intervals of from twenty to twenty-five years will show better returns than natural seedlings of promiscuous trees. It is now easy to sell at good prices small timber for which there was formerly no demand. Indeed, it is doubtful if it be longer advisable to raise large trees, which attain maturity only at the end of periods of seventy or eighty years. Greater profit comes to the owner of a timber lot from cutting smaller quantities of timber, at the end of shorter periods, than he has been wont to do. By this practice the trees are oftener thinned, the sunlight and air is more freely admitted among them, and their growth is accelerated. When we come to the practice of systematic forestry and assign to individual trees regulated spaces, as we do to our cornstalks, we shall find their growth hastened some twenty-five per cent.

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moval from four-acre sections, and its sale for $8 per thousand, of six and a quarter thousand feet of lumber per acre, from a timber lot of one hundred and forty acres, for a period of thirty-five years, at the expiration of which the entire lot will have been cut over, shows some interesting results.

The aggregate sales of $200 per year, without interest, amount at the end of this period, as is readily apparent, to $7,500.00. If the several amounts of the annual sales have been invested at five per cent interest, and left undisturbed, to accumulate, they will be found at the end of each year of this period to be as follows:

35th	year's cutting,	$200 and	5 pr. ct. int. for 1 year	= $210.00	
34th	"	"	2 "	= 221.50	
33d	"	"	3 "	= 231.53	
32d	"	"	4 "	= 243.11	
31st	"	"	5 "	= 255.27	
					$1,160.41
30th	"	"	6 "	= $268.03	
29th	"	"	7 "	= 281.43	
28th	"	"	8 "	= 295.50	
27th	"	"	9 "	= 310.28	
26th	"	"	10 "	= 325.79	
					$1,481.03
25th	"	"	11 "	= $342.08	
24th	"	"	12 "	= 359.18	
23d	"	"	13 "	= 377.14	
22d	"	"	14 "	= 396.00	
21st	"	"	15 "	= 415.80	
					$1,890.20
20th	"	"	16 "	= $436.59	
19th	"	"	17 "	= 458.42	
18th	"	"	18 "	= 481.34	
17th	"	"	19 "	= 505.40	
16th	"	"	20 "	= 530.67	
					$2,412.42
15th	"	"	21 "	= $557.20	
14th	"	"	22 "	= 584.06	
13th	"	"	23 "	= 613.43	
12th	"	"	24 "	= 644.10	
11th	"	"	25 "	= 676.31	
					$3,075.10

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10th years' cutting,	$200 and 5 pr.ct. int.	for 26 years	= $710.13	
9th	"	"	27 " = 745.64	
8th	"	"	28 " = 782.92	
7th	"	"	29 " = 822.07	
6th	"	"	30 " = 863.17	
				$3,923.93
5th	"	"	31 " = $906.33	
4th	"	"	32 " = 951.65	
3d	"	"	33 " = 999.23	
2d	"	"	34 " = 1,099.19	
1st	"	"	35 " = 1,160.41	
				$4,116.81

Amount of an. cuttings and int. at the end of 35 years $18,059.90

If these several amounts be condensed at the end of each successive period of five years they will foot up as follows:

At the end of five years to . . .	$1,160.41
At the end of ten years to . . .	2,641.44
At the end of fifteen years to . . .	4,531.64
At the end of twenty years to . . .	6,944.06
At the end of twenty-five years to . .	10,019.16
At the end of thirty years to . . .	13,943.09
At the end of thirty-five years to . .	18,059.90

Should the proprietor be so situated as to require for use, from time to time, portions of these accumulations, the remainder will still increase by yearly additions and by annual interest; while, at the same time, his standing timber is also increasing by annual deposits of new wood. If for instance, he should see fit, at [the end of twenty years, to withdraw from these accumulations a thousand dollars, and at the end of twenty-five another, and five years later another still, he will find at the close of the supposed period of thirty-five years, that he has still to his credit the snug sum of $13,069.00.

A PORTION OF EVERY FARM SHOULD BE IN FOREST.

In the old-time notices of farms for sale, this phrase, immediately following the number of acres offered, "suitably

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divided into tillage, pasture, and woodland," was very common if not universal. Every farm was then supposed to possess a "suitable" area of wood and timber. If one was without this, it furnished an exception to the general rule. But times have changed and the converse is now too often true. The remaining forests in many of our towns are in a disordered condition and strangers to all systems of management but that of caprice and neglect. In the older parts of the State the amount of standing timber has been fearfully diminished. Hundreds and thousands of valuable timber lots have been thoughtlessly sold by their owners, and immediately afterwards stripped of their growths by their purchasers. By this means, the real estate valuations of towns have often been materially reduced.*

It is often a matter of surprise that a careful farmer, who is unwilling to sell a neighbor a bushel of corn worth seventy-five cents, except after careful and streaked measurement, is willing to sell a speculator, of whom he often knows very little, his entire timber lot, his inheritance, perhaps, from more prudent ancestors and worth thousands of dollars, and to fix the price by guess. And when he has sold it and received his pay for it, he wonders what he shall do with the money, and is led, perhaps, to be cheated a second time in the purchase of high interest promising mortgages on farms poorer than his own, in the arid regions of Western Kansas or Nebraska, brought to his notice by some peripatetic bond pedlar.

The ordinary farmer needs a wood and timber lot as much as he needs pasture and tillage lands, as much as he needs cattle and farm buildings. He cannot be a first-class farmer without it, he cannot have full winter occupation in such a climate as ours. Has it ever occurred to you that the average farmer of New Hampshire is attempting to get a living

*Other considerations than a desire to realize the value of standing timber have, in many cases, led to its removal. In the vicinity of large towns, owners have sometimes been induced to cut it by the fear of fires often carelessly or willfully set. As this kind of property has diminished in quantity, exaggerated ideas of its value has, at times, led to a taxation of it which its owners have deemed excessive, and, to avoid this, they have sold it.

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and a competency by less work than is expended in their various avocations by the other members of the community in which he lives? How many of us get in full days' works from the time the ground freezes in the fall until the frost leaves it in the spring? How many of us do much more than tend our stock, get up and manufacture for home use a year's supply of wood, and help break out the roads of our highway districts now and then? And yet, there are no less than one hundred and twenty-nine secular days between the 15th of November and the 15th of April, when the sun is ten full hours or more above the horizon. Forty-one per cent of all the working days in the year lie inside those two dates. It is taking us too long to get rested after our fall plowings. The seats of our pantaloons wear out faster in winter than their knees do. It becomes us to brace up.

Somehow or other, in the industrial world, returns are very largely dependent upon hours of labor. The rules of political economy may be vigorous, but they are generally fair. Indeed, the man who works two thirds of the time, has no right to claim as much compensation as he who works a third more. If he does he will rarely get it. The manufacturer runs his mill every day. So does the trader his store. The professional man and the mechanic do not discontinue their labors in winter. The farmer alone, like the bear and the woodchuck, dens up in winter and mainly because he has little to do. In other words, he has organized for himself no work for that season. To your interrogative surprise that he should lie still so much of the time, he complacently replies, what can a farmer do when the ground lies frozen two feet below the surface of the snow? To this inquiry there is usually but one answer, "put for the woods!"

Until we have organized for ourselves regular winter occupation, we have no right to expect full success in farming. To do so, is to ignore the industrial law which everywhere prevails, and to which all occupations are alike amenable, the law that return is in proportion to outlay. And when cold weather occupation can so easily be found in the woods,

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it becomes us to have upon our farms due proportions of forest and to give attention to their systematic management. Their returns may be made as sure as the revolution of the seasons, our whole time will be profitably employed and our axes will ring in harmony with the click of the artisan's hammer and the splash of the miller's wheel.

Walter Scott used to say, that a walk of a mile or two before breakfast was a good thing, and best if it was over one's own land. I know of no walk more agreeable than a winter one through a well kept timber lot, particularly if it be one's own and owes its thrift largely to his instrumentality. And it will be all the better if taken daily for a considerable period in company with sleek-haired cattle and comely horses. The shouts of teamsters and the crackle of broken snow crusts are inspiring sounds in the clear, frosty air, while the solemn sighing of the winds through the columns and beneath the arches of nature's great temple makes grander music than any which rolls beneath the dim vaults of old cathedrals, dun with the stains of centuries, and redolent of associations of a remote past.

OUR ANNUAL FOREST CROP.

I have been unable to obtain as full statistics of the annual forest crop of this State as I have desired. My main reliance has been upon the United States census returns of 1880, which are now eleven years old and less complete than I wish they were. But they are better than any which have preceded them, and, let us hope, to be surpassed in all respects by those we are now so impatiently awaiting.

According to the returns of 1880, the most important statistics of the lumbering interest were:

Amount of capital invested . . .	$3,745,790
Value of the logs of that year . . .	2,159,461

The maximum number of hands employed at any one time during the year ending May 31, 1880, was four thousand one hundred and sixty-five.

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The amount of wages paid during the year was $548,556. The products of this year were:

Lumber, board measure	292,267,000 feet
Spool and bobbin stock	3,072,000 feet
Number of laths	49,454,000
Number of shingles	67,086,000
Number of staves	31,354,000
Number of sets of headings	3,491,000
Value of all other products	$58,612
Total value of all forest products	3,842,012

From this statement it appears that the total value of our lumber products during the year above mentioned, was nearly one third as much as the value of our primary agricultural products ($13,035,250.76). The rank of New Hampshire, in 1880, among forty-nine other States and territories, as a lumber producing State was among the first third of its associates, being in importance the fifteenth.

If to the total value of the products above mentioned, there be added that of wood used for domestic purposes, estimated at 567,719 cords and valued at nearly two millions of dollars ($1,964,669), we shall have a total of nearly six millions of dollars ($5,806,681), and that without including the wood exported from the State, or used by its railroads, brick yards, and manufacturing establishments.

It would be hard to estimate the present value of our forests, for the want of sufficient data upon which to base a reliable calculation. The annual value of their products, as just now cited, embraces more or less of labor, the elimination of which, owing to a want of exact knowledge as to its amount and value, is a matter of great difficulty. If, however, we place their net returns at four millions of dollars and capitalize them upon a five per cent basis, we shall be constrained to appraise them at one hundred millions of dollars—an amount nearly twice that of the entire capital employed in our manufacturing establishments ten years ago.

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But however uncertain their exact value may be, it is enough, under any method of reckoning, to give them high rank among the leading natural resources of our State.

FORESTRY OF THE FARM.

But it is to the importance of forestry as a part of our farm work that I desire especially to call your attention. I am satisfied that we have erred in the management, or rather non-management, of our wood and timber lands. From many farms they have disappeared almost entirely. With them has gone much of former winter occupation, and with it the income which came therefrom. If we would attain to highest agricultural prosperity, we must invite them back again, thereby enhancing the beauty of our farms and the value of our estates.

During the last twenty or thirty years, the agriculture of New Hampshire, and indeed of all New England, has made great progress on several important lines.

Cattle husbandry is now understood as it has never been before. Fine herds of the different breeds may be found in all considerable sections of the State.

Dairying has been extensively and diligently studied by enterprising persons of acute minds. As a result, its products have been improved in quality and the business has been made a success.

Notwithstanding the roughness of many of our fields, the scythe has largely given place to the mowing machine, the spreading fork to the tedder, and the hand-rake to the horse-rake. The old wooden mould-board plough, made by guess, has become an object of antiquarian curiosity; supplanted by ploughs of cast iron, which have gone through numberless improvements, it is now represented in the field by those of steel or chilled iron, constructed upon scientific principles, whereby the least amount of power is required to do a given amount of work. Similar remarks apply as well to most of the implements in use upon the farm.

We are also giving more intelligent fertilization and better

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culture to all of our arable fields, whereby their productiveness is increased. As a consequence, good farmers are raising better crops and making more money, than their predecessors were wont to do. Notwithstanding the high price of hired labor and its unreliableness, the attachment of brute power to well devised machinery has in a large measure overcome these hindrances and bids fair, in the end, to surmount them altogether.

Indeed, there is every reason to suppose that when the husbandmen of New Hampshire shall rise to a determination to apply as much intelligence, perseverance, and skill to the requirements of their work, as do the mechanics, manufacturers, and traders to theirs, their association will become as remunerative.

On one line of their business, however, the farmers of today have exercised less care and been more wasteful than were their fathers. On most farms, forty years ago, was found a wood and timber lot bearing fair proportions to their importance. But where now are these? The farm which is "suitably divided into tillage, pasture, and woodland," is the exception rather than the rule all over the lower part of the State and over much of its upper part.

If we mistake not, the next line of our agricultural departure, should be that of an improved forestry. Forestry should be a part of farm work and to it should be devoted more or less of the one hundred and twenty-nine days already alluded to, for which too many of us have too little to show. And when I speak of forestry, I mean a treatment of our woods as intelligent and systematic as we bestow upon the arable portions of our farms. This may require study and perseverance, persistently pursued, year after year. But it will be repaid over and over again by an enlarged income and the broadened intelligence of every person who thus rises to the plane of his opportunities.

And, fortunately, we can turn to the consideration of this subject with pleasant anticipations, encouraged by the fact that the errors of the past are not irremediable. While we

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have denuded too many of our wood lots thoughtlessly and foolishly to our injury—very much as an improvident farmer cheats himself by half starving his cattle in winter and helps perpetuate that wretched phrase, "spring poor," but knows the while, that the early feed of the pastures will restore soundness of form to the kine—we know that time and good management will make thrifty our neglected woodlands. He has been cruel and foolish. We who may have mismanaged a wooded inheritance have been simply foolish. But to blunder knowingly is almost equivalent to a crime.

The time is not distant, and in fact now is, when landed estates will be sought within our borders by persons from without; many of whom possessed of large capital, desire to spend a part of their time each year in the country. There is something in the old English nature of the New Englander, unextinguished by time or town life, which makes him seek a rural abode, just as instinctively, as a duck takes to water. As soon as a competency permits, he seeks a home in the midst of acres which he can call his own. Of the hundreds of thousands who come to us every year for sojourns of different periods, more and more are acquiring land and houses for their summer occupancy.

Some of these estates already acquired are extensive and remind one of similar homes in the old world beyond the Atlantic. The Corbin park of twenty-one thousand acres; the Shaw park in Carroll, of some four hundred; the Hutchins farm of some six or seven hundred, on Governor's island in Lake Winnepesaukee; and that of Mr. Hay on the shore of Sunapee lake are samples of the more important of these estates. Others less extensive, scattered everywhere are becoming more and more numerous every year. Within the last two years, some three hundred of our thirteen hundred abandoned farms have been re-occupied by summer residents as summer homes.

Wherever such persons come and improve their purchases, they enhance the value of adjoining property, and increase the valuations of their localities. They also bring to quiet

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neighborhoods much of the spirit of the active communities from whence they come. With them come also intelligence, refinement, and attractive social life. Wherever one such family makes its home, it is likely, sooner or later, to attract others and cause a demand for adjoining estates which may chance to be for sale.

But persons who purchase grounds of considerable extent desire forests as well as open fields. Inasmuch as it is easy to transform a thrifty piece of woodland into a pleasing park in a few years' time, land of this kind is often a *sine qua non* in a proposed purchase. In fact, one of the leading charms of New Hampshire scenery are its forests.

It therefore becomes every farmer to keep in good condition his wooded area. This renders his farm more desirable, if at any time he desires to sell it. It will pay him a surer profit than his grain or grass fields if he chooses to keep it. It requires neither ploughing nor planting. Its increase is the gift of God. It grows while its owner is sleeping.

Thus, Mr. President and gentlemen, imperfectly, indeed, but as best I could, I have spoken of our forest area, determined largely by the configuration of the States' surface; of our lumbering, an industry imposed upon us by geological necessities; of the possible profits and the management of our woodlands; of the forest crop of 1879; of the demand for forest property by persons coming to reside with us, for a part or the whole of the year and of the very great importance of bringing forestry into the common round of farm work.

This last proposition I desire to emphasize, for I am convinced, both by my own personal experience and by observation that the reckless treatment of our woodlands has greatly impaired the value of our estates and injured more or less the beauty of the scenery around us, and that we have reached a stage of social development when this has a cash value and will bring cash in the market.

But although we have gone on blindly and made mistakes on this line, Nature, kindly forgiving, will soon reclothe these

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mutilated areas if we will but allow her to do so. Let us then, not only accord to her that permission, but, in every possible way, aid her in her beneficent effort.

PROF. BREWER: A number of years ago I paid a good deal of attention to this matter of forestry both from the theoretical and practical side. I may say that we prepared the first land map of the country that was ever prepared. At the the time of the census of 1870, General Walker, who was superintendent of that census, got up a district map of the United States, and he came to me and wanted me to take hold of the woodland part of it. He said that he would supply the agricultural portion. In making that map the county was the smallest unit used and we had to go over the statistics of every county in the United States and get the relative portion of woodland that was returned. That was the basis on which we began, and I got all the information that I could from other sources. The map was published in an atlas by congress about 1873. I became very much interested in the subject at that time.

I have not the slightest doubt but what in our older States we have got to go to planting trees. It is not yet certain what kind of trees can be planted with the best results in New England. The time will shortly come when it will be realized that it is just as important that trees should be planted and the forests looked after as that the other crops should be planted and looked after. As a matter of fact all over Europe except in England, schools of forestry were established and maintained before the schools of agriculture, and here in America we will have to give more attention to the subject than we have done. The time is coming, I haven't a shadow of doubt, when, after we have cut off the timber from our woodland instead of leaving it to grow up to bushes or instead of burning it off, we will go through and plant in those trees that we expect will be of value to us afterwards. I delivered a lecture on this matter a number of years ago. One man gave his experience in this direction. On land which was not more than five or six dollars an acre,

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white pines were set out, and, as it stands in my memory, it was only thirty years afterwards that the timber on that land was sold for one hundred dollars an acre.

We have not yet determined what kinds of trees can best be set out in New England. We have not succeeded in planting oak economically, but white pine can be set out, I think, and grown with profit. It is very certain also that certain of the larches may be, although how far that is to be depended upon, we do not know. There is to-day a tremendous consumption of young trees for railroad ties. The destruction of these young trees is something enormous. In the course of time we have to correct this, and I believe the time is close at hand when we have got to do it. This is a matter of national importance, not only on account of the future necessity for timber, but also on account of the effect the cutting of these trees will have upon our water power. I do not believe the amount of woodland seriously affects the rainfall, but it does affect the flowage of the streams enormously. Of that there is no question. I tell you that it is an error to believe that the mountain denuded of timber and burned off, clothes itself again with timber. I do not know of any mountain that has been denuded of timber by the ravages of fire or the cutting of the timber that ever succeeded in clothing itself with timber—with good timber, I mean. It has been found in the Old World that such forests have had to be planted and that trees would not spring up spontaneously in the places of those that have been cut off.

Considering the large amount of money that is left here every year by tourists who come here to enjoy the scenery of your mountains and of your forests, and considering the importance of the water power of the State, it seems to me that there ought to be some form of state policy regarding the care of the woodland. I do not know of any subject which the Board of Agriculture can keep before it, or the people, that seems to be more useful for the general prosperity of the State than that one of the woodlands. I am very glad to see it brought up here in this meeting.

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MR. WALKER: I want to say one word. Professor Brewer has alluded to the value of our scenery. Our scenery has a cash value. You may say that is all bosh; that is all sentimentalism. It is not. There is a cash value to our scenery. Mr. Bachelder, Secretary of the Board of Agriculture, in 1889 sent out his circulars and found that the summer boarders left in New Hampshire in 1889 five millions of dollars. Let us measure that by the corn crop. The corn crop of New Hampshire according to the last census was a million and a quarter bushels per annum and a little more. If that corn crop was put on the market and sold for one dollar a bushel,—which is twenty-five cents more than it could be sold for,—it would bring $1,250,000, which is only a quarter of the amount that these summer boarders have left here. Now the reasons for a far-reaching policy of forest maintenance are various. In the first place we want to preserve our forests so far as we can and preserve the scenery. As Professor Brewer says, we want to preserve the mountain rivers of the State, and we cannot do that if those mountains are denuded. Look at the presidential range of mountains and the other mountains of the State. Covered with forests, as they are, they act like a great sponge which holds the excess of rainfall, it is gradually squeezed out, and we have as the result the reliable Merrimack, which at all times of the year provides our manufactories with water and yet never becomes a fierce destroyer. But if we cut the forests from these mountains and then burn the ground over with fire so that there is no vegetation left, what do you think we would have? In March and April when the snow was melting up in these mountains, we would have a tremendous torrent coming down, which would destroy everything, while during the dry season, there would be but little more than a brook. The regularity of the flow of our streams depends upon the preservation of our forests above here, and to a greater or less extent the preservation of this city depends upon that great sponge up there, which we ought to see is protected from the attacks that are being made upon it.

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PROF. BREWER: Take woodland, and there is this sponge, as Mr. Walker has called it, under the trees. The snow does not melt off so fast in the spring since it is shaded by the trees, nor does the ground freeze so deeply where there are no trees. Where the trees are scattered the ground freezes and becomes hard and then when the snow melts it flows off very rapidly. The great floods of the United States bear evidence to this. The floods come from the cleared lands rather than from the forests. As the ground is frozen in these agricultural lands the whole tendency of the surplus water is to run away in torrents. Now of all the water that falls in rain or snow, about five eighths flow away in the streams and about three eighths evaporate from the forests and soil. Now, of this five eighths that flow away in streams, the greater portion in the early spring comes down in torrents where the land has been cleared off. The Ohio river is an instance of this. The lands around the upper waters of the Ohio have been largely cleared off, and I have no doubt but what these floods of which we read will continue, because the water flows off so quickly from the denuded lands, and it is not held back by this sponge around the roots of the trees or by the woodland swamps.

THE PRESIDENT: Mr. Walker remembers the spot of the king's marked on the trees. About twenty-five or thirty years ago, I was looking through some timber in Boscawen, and I came across a number of trees with those marks upon them. I do not know but there are some there to-day. The distinct marks were there at that time.

MR. WALKER: I want to say one word here in regard to our president. Some years ago I was more enthusiastic in regard to this forest question than I am now. His Honor, Mayor Humphrey, he was at that time, was running a manufactory of kits up at West Concord. I asked him what he was paying for white pine wood — not timber but wood. He said that he was paying $4 a cord. He was taking that wood to his mill, cutting out the knotty parts, leaving the sticks about fourteen inches long. From that wood, by

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means of his machinery, he was cutting out mackerel kits and sending them to Boston. After he had told me what the wood cost him, I asked what a cord of it was worth after it was manufactured into mackerel kits and ready to go to Boston. He said, "That is considerable of a computation, and requires a little figuring." Two or three days afterwards he told me that he had figured it up and he said: "That cord of wood after it has gone through my mill is worth $26." "Well," said I, "you have then paid $4 and made $22." "No," he replied, "I have not." I asked him where it went to then. He said, "It went into the pockets of my men." "Where then did it go?" "It went into the stores at Concord village, went to pay the storekeepers and market-men." That was the only industry that used to keep alive that little village of West Concord.

Now the moral to which that points is here: The Almighty has said to us, You have got to raise timber here. You cannot plow these hills and mountains, they are too rough; the rocky formations are set up edgewise, and it is impossible for you to plow these hills, and you cannot pasture very many of them. You should raise timber. Then, what? Then go to work and take care of your wood and timber lands. What next? Then instead of cutting them off and sending them in the log to Turner's Falls and various places in Massachusetts to be manufactured, manufacture them in the mountains and take the difference between the rough log and the manufactured product and put that into your pockets. Then there grows up a little village for the support of these manufacturers and their operatives, and then there grows up a market for the surrounding agricultural portion of the community. I take it that that is our destiny. In the first place we should accept what God has given us, be careful of it, and then work out our own salvation on the line that he has shown us.

PROF. BREWER: I question very much indeed if the Concord carriages would have gained and maintained the reputation that they have if those Concord coaches had been made out

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of wood grown in other parts of the country. The fact of the matter is, that the oak and hickory of New Hampshire is tougher than the oak and hickory of the West. I think you will find that one reason why the Concord coach has such a large reputation is because of the timber of which it is made. I know from my own personal experience that when I want to use a rough mountain wagon I take special pains to buy a Concord wagon rather than one made in Ohio. The reason for that is that I believe the timber to be better.

THE PRESIDENT: Mr. Walker alluded to me as cutting up the small pines. I have done my share of that, I guess. At that time the only way was to buy the timber on the stump, and I put my men to work on it and got it out. The money that I got from this business I divided up amongst my friends and workmen, etc. I wish I was in that business now, but the time for that has gone by. It grew up with me and died with me. I started it in 1841. There was one good thing about it and that was, that I made an article good enough so that I always got into the market for all of anybody else. I got the highest price for the goods down to the last moment.

The first lot that I cut, I left some trees. I have watched them with a good deal of interest. They have now got to be great tall pines, while at that time they were not more than four inches thick. Sapling pine requires only about thirty-five years to get a comfortable growth and some of them get it in twenty-five years.

MR. WALKER: I would like to ask Professor Brewer why it is that oak that grows in the pasture is tougher than that grown in the forest.

PROF. BREWER: I cannot give any reason for it, except that it grows tougher in those places. Where timber grows close together it is not as tough as where it stands out. Precisely why that is so, I do not know.

MR. WALKER: Might it not be the fact that it grows out and has stood against the winds which has delayed its growth, whereas if it grows in a clump it grows more rapidly and for that reason is tenderer — like the plant under glass?

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PROF. BREWER: As I have said before, I do not know. I do know that it is tougher than where it grows closer together.

THE PRESIDENT: This meeting stands adjourned until this evening at half past seven.

EVENING SESSION.

THE PRESIDENT: The hour for this meeting having arrived, you will please give attention to the remarks to be made by Ex-Governor Goodell. I will guarantee that what he says will be right to the point.

NEW HAMPSHIRE.

BY HON. D. H. GOODELL, EX-GOVERNOR.

Mr. Chairman, Ladies and Gentlemen:

The secretary has given me a subject, and that subject is one upon which I have talked so much during the last two years and indeed for the last fifteen years, that I am almost afraid that some of you who have heard me talk upon it before will hear some of the same things to-night.

But I am intensely interested in this great subject of the glorious old State of New Hampshire; for I was born in New Hampshire, have lived in New Hampshire ever since I was born, and expect to live here as long as I am among the living, consequently I do not see any reason why I should not be interested in my native State and the State of my home. I am proud of the old State of New Hampshire. I am proud of it because of her great products; I am proud of it because of the great men that she has furnished the world, and when I say that she has furnished more, according to her population, of the great moving spirits of the country than any other State in this country, I believe I am speaking the truth. For what State has produced the equal of Daniel Webster, or what States have produced a Pierce, a Louis Cass, a Zachariah Chandler, a Wilson, a Chase, a Dr. Miner, a Dr. Gordon, and multitudes of others of a similar character who could be named, that were born and bred in this grand old

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State of New Hampshire? And I never felt more proud of it than I did early in the session of 1889, when Massachusetts came up here with a hundred men and brought us the picture of Benjamin Butler — that picture which you have seen on the right as you enter the rotunda of the state house, where it has hung ever since it was presented to us. When it was presented it became my particular privilege to accept it on behalf of the State, and I at that time felt proud because Massachusetts recognized New Hampshire as the mother of her great sons, and came here to present to us, not what we gave them, but simply a picture of him, because they would not let him go. I spoke at the time of the fact that when he was governor of Massachusetts the president of the Senate was George G. Crocker of Mount Vernon, New Hampshire; and the speaker of the House of Representatives was Marden, also of Mount Vernon; and the mayor of the city of Boston was Palmer, also a New Hampshire man. In the next Legislature the president of the Senate was the present attorney-general of Massachusetts, a New Hampshire man; and the speaker of the House was the late Governor Brackett of Massachusetts, who was born here in New Hampshire. And it seems as though whenever they wish to select their best men, they select those that we have given them. I said at the time that the old man of the mountain in the northern part of our State was the sign which the Almighty hung up there showing that he proposed to raise men in New Hampshire. That sign still hangs out there, and we still propose to do that sort of business — raise great men and women. Not only that, but we propose to make New Hampshire so attractive that these men will not leave us to go into Massachusetts and other sections of the country.

I am proud of New Hampshire because of its glorious scenery, the equal of which can scarcely be found in any other part of the country, if of the world. As was said here to-day by one of our distinguished citizens, it has a cash value. If in 1889 we received $5,000,000 in this State, for our summer boarders, surely in 1890 we received a much

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larger sum, for the popularity of our boarding houses and hotels, the grandure of these mountains and hills, the beauty of our lakes and rivers, are continually increasing and the people are coming here every year in greater and greater numbers.

I am proud of New Hampshire because of its opportunities. And its opportunities and privileges are continually increasing. A few years ago Massachusetts had a great advantage over New Hampshire in many respects. Our Massachusetts friends will not, I am sure, find any fault when I speak of the few facts that I am going to relate. A few years ago the manufacturing cities of our neighboring State had a great advantage over New Hampshire from the fact that we were up here in the country and were left out in the cold, as the saying is. If we attempted to manufacture anything, we were obliged to send it to Boston or some other place near there before we could start it on its journey to the West or South. I mean by that, that we were obliged to pay freight on all our products to some place in Massachusetts before we could get the advantages they had. I have been often told that it was a strange thing for me to attempt to do a manufacturing business way up in the country where I live. When I began I was obliged to cart my freight seventeen miles to reach a depot and then pay local freights from there to Boston, before I could get it started on its western course at the same rates at which nearly all the cities of Massachusetts could ship their goods. But this is changed. It has changed so far as I am concerned; it has changed so far as you are concerned; it has changed so far as people in almost all the sections of the State are concerned. And instead of our being obliged to pay more than they do in Boston, or New York city even, we are now able to ship our freights to Chicago, St. Louis, Minneapolis, Cincinnati, and all western points just as cheaply as we could if we shipped them from the depot in Boston. A short time ago I received a book from a transportation company in which they said that they would take my freight at my depot and deliver it at all points named in that book at the same rates as from Boston or New York.

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I looked that over carefully and found that, with the exception of a few cities and towns on the Atlantic coast, I could deliver my goods from our depot to all southern points at exactly the same rates of freight that I could if I lived in New York or Boston. You see what an immense advantage that has given us as manufacturers over what we had a few years ago when we were obliged to carry our freights into Boston and pay the local rates before we could get the advantages that they had. You remember what was told here by the distinguished horticulturist and market gardener, Mr. Rawson, when he said that a man could hardly afford to be ten miles away from the market if he were going to be a regular market gardener; and if a man could be but two miles away, it would give him a wonderful advantage over his competitors further away. We have been practically living further away from the markets of the world than the cities of Massachusetts, but now we have the same advantages in that respect as they, and we may now expect our population to increase much more rapidly than it has in the past. Of course we cannot expect to rival Boston, but leaving Boston outside, with its four hundred thousand people, they have four or five times as many people living in Massachusetts as we have in New Hampshire. We have, however, acres of territory more in New Hampshire than in Massachusetts; we have stronger rivers than in Massachusetts; we have a vast deal more water power, occupied and unoccupied, in New Hampshire than they have in Massachusetts. We furnish, it is true, the Merrimack to the cities of Lowell and Lawrence, and we also furnish water power for Holyoke and Turner's Falls; but we have all the rest of these rivers to ourselves, and they give us an enormous amount of water power that is not used at the present time. That means reserved force. We also have better land, as a rule, than they have in Massachusetts that is available, and there is no reason why the agricultural population should not keep pace with the manufacturing population. We ought to be able to grow as we never have before. It does seem to me that we have got

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started in the right direction. It seems to me that we never were in so favorable circumstances and never in so prosperous condition as we are to-day. It seems to me that the sentiment of the people of our State has changed wonderfully during the last few years. It seems to me that that old idea which prevailed as long ago as I was a boy, when Daniel Webster said that New Hampshire was a good State to emigrate from, has changed to a wonderful degree. I think that was one of the meanest things that Daniel Webster ever said, but it was in accordance with the sentiments of those times. The time has now come, however, when we can stand on an equal footing with other States, so that we may now call ourselves the hub of the universe, if we please, so far as manufacturing is concerned. We all feel that we have something in New Hampshire that is worth our cultivating and our efforts. Now I am sure that you will all agree with me that it is better for us, for our sons, for our daughters, for our neighbors, and for our friends to remain around our old homesteads and in the climate in which we were born and reared, with the associations with which we have been surrounded from early childhood, here in the midst of churches and schools — that you will all agree with me that it is better for us to remain here, if we can find employment and can be as successful as we can elsewhere, than to go out into other places. For here we are more likely to be in the enjoyment of good health, of privileges and blessings that we can never get anywhere else. If that is the case, why should not we open our eyes and see the great privileges that surround us, why should not we teach our neighbors and our friends that we can do just as well here as anywhere else, why not present to them the examples of great successes that have been gained here in New Hampshire and tell them of the failures of many of our friends that have gone away? We hear of the Austin Corbins, of the Pillsburys and that class of men who have gone from New Hampshire and succeeded, but we do not hear of the young Raymond or Smith or many others, who have gone away only to return perhaps decrepit

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and old and weak and enfeebled and poor. It is time for us to stand up for New Hampshire. It is time for us to stand up for New Hampshire agriculture. It is time for us to remember that New Hampshire farmers are the most successful farmers in this country. It is time for us to remember that the New Hampshire farmer has more accumulations than any other farmer in all the world. It is time to remember that within the last year we have put into the savings bank $8,000,000, more than twice the amount, according to the population, put in by any other State in the country. I ask then, these being the facts, why should we not publish them to our neighbors, and to our friends, and constantly bring up before them the opportunities and the privileges we have here at home. But some of you will say that this vast accumulation in the savings bank comes from the manufacturers and manufacturing cities, and places where they make great wages. That is not true. The city of Manchester has $140 apiece in the savings bank, for every man, woman, and child that she has in the city. The little town of Bow, down here has got $336 apiece; that little town right down close by the water; that town that has been improving its opportunities; that town invites people from all the world to come and enjoy its blessings there—that town has $336 per inhabitant in the savings banks of the State. Over here is the little town of Newbury and I believe there are about five hundred people in it. Almost everybody acquainted around here knows that it is about the poorest farming town there is in the State; yet she has $255 in the savings bank, for every man, woman, and child. What more arguments can we produce to convince you of the prosperity of New Hampshire. The farmers of New Hampshire have got the money in New Hampshire. Although there may be a few rich capitalists who have made greater successes than most of the farmers have made, yet as a rule the farmers are the men who have the money of New Hampshire. With these facts before us, we do not want to wait until next year or next month, but it is now, that the people of New Hampshire should stand up in

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their dignity and declare that we here in New Hampshire are on the topmost round, so far as financial prosperity is concerned, and so far as the prosperity of our schools and churches and all our people are concerned. This, my friends, I urge upon you all to do.

I must not take more of your time this evening for I know that you are waiting to hear from my distinguished namesake, yet I wish to urge upon you the importance of forgetting the past and looking towards the future, determining that New Hampshire shall no longer remain in the rear but that she shall take front rank, as an agricultural State and as a manufacturing State. Let us all act together in this line of work, and we shall come out finally among the most prosperous of the States. In some respects we are the most prosperous to-day. So let us stand on our dignity and let us be firm in our convictions as in our principles. Let us teach our children that they can live in New Hampshire and enjoy as great privileges and as great blessings as they can in any other part of the earth.

THE PRESIDENT: Governor Goodell, as he was speaking of the great men that were raised in this State, did not tell you that they came from around the mountains of the State. Samuel P. Chase was raised near Croydon mountain, and that is where the Corbins lived. So we may find the same circumstances to have surrounded the boyhood of others of New Hampshire's great sons. Why is this? It is because they, as boys, were brought up to habits of industry and thrift. Their surroundings compelled them, and their fathers and mothers taught them to work, and that laid the foundation of their future greatness. They knew what work was and they knew what it was to have trusts imposed upon them. They learned that early upon the farm. I think this thing we want to keep well before the people—where we raise our great men and women. New Hampshire produces great women as well as great men. I came from Massachusetts into New Hampshire for my wife, and she was the making

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of me. I also got my second wife in New Hampshire. And if New Hampshire produces all such women as they, it is no wonder that men should take their wives from here.

I want to say that I am Massachusetts born, and while I have been here forty-five years and have gained what success I have gained in life in New Hampshire, I always will stand by the old colony of Massachusetts.

I now have the pleasure of introducing to you President Goodell of the Massachusetts Agricultural college, who will speak to you on the subject of "Agricultural Education."

AGRICULTURAL EDUCATION.

BY PROF. H. H. GOODELL, PRESIDENT MASSACHUSETTS AGRICULTURAL COLLEGE.

The question that has been set for me for this evening's address is, "Of what value are agricultural colleges to the farming interests?" Perhaps I can best answer this by asking another question, found in a book that contains the wisdom of an age two thousand years older than this: "How can he get wisdom that holdeth the plow, and that glorieth in the goad, that driveth oxen and is occupied in their labors, and whose talk is of bullocks?"

Apparently the same need of instruction was as urgent then as now, and the tiller of the soil in the fertile plains of the Eastern world, felt there was something more to be desired than simply following, day in, day out, the dreary routine his fathers had left him. That there were sources of information even then, is evident from the fact that the wise Solomon could discourse of trees, from the cedar of Lebanon even to the hyssop springing out of the wall; and it is added, that he spake also of beasts, of fowls, of creeping things, and of fishes. The same questions that stirred the heart of the agricultural seer so many centuries ago, are pressing with renewed force now, and more light is sought on all the difficult problems that present themselves to the farmer of to-day. It is the mission of the agricultural colleges to furnish this

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light and lead the way. But this cannot be done on the instant. It requires time. Said President Clark, "ten years are necessary to establish one agricultural fact," and it is only upon an aggregation of facts and experiences that stable law can be based. Or putting it in other words, "It is but the sum of what is known on any subject, so collected and arranged that use can be made of it." But this patient waiting was just what an impatient public could not brook and no sooner were the agricultural colleges established than results were instantly demanded, and because the wornout meadows and unproductive thistle patches were not forthwith changed into smiling fields of waving grain, the whole system of agricultural education fell into disfavor. It was forgotten that the land was new and untrodden, and that even spies could not be found to adventure forth and bring back tidings of the promised land. It was forgotten that there were no agricultural, no horticultural professors. Hardly a single professor of veterinary science and no text books applicable to our conditions or circumstances. The whole system of instruction and instructors was to be created out of nothing—out of such raw material as was found ready at hand. But this was not thought of, and results—immediate results, was the cry. In the first flush of enthusism at the undertaking of scientific investigation, a squash had been harnessed in an iron yoke, and by the expansive force of its growing cells had fairly swung the lever from which depended the enormous weight of 5,550 pounds; a maple tree had been tapped, a gauge inserted, and the pressure of the flowing sap had been proved to represent the force requisite to sustain a column of water eighty-four feet in height; the roots of a squash vine had been washed out and measured, and found to aggregate about fifteen miles in length, having been produced at the rate of one thousand feet per day. These were highly interesting facts—facts that led the gifted Agassiz to say, that they alone were worth all the money that had been expended thus far in the establishment of the college; but they were not immediately conducive to the getting of bread, and forthwith the public fell

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upon the college and said they would have none of it. That mercurial people, the French, with all their restlessness and activity of mind, have set us a noble example of the patient waiter, and at an annual expenditure of $1,000,000,* calmly waited a full decade of years and tested their educational system in agriculture before making it compulsory and enacting a law enforcing it. The Germans have been content slowly to add link to link, making persistent effort to take advantage of every period in the development of mind of those destined to agricultural pursuits, until they have elaborated their present carefully rounded system, each link, complete in itself, and yet absolutely necessary to advance to a higher grade. And even the Italian minister of agriculture, at the opening of one of the higher schools, is reported to have said: "The stately tree is the growth of years. We do not cut it down because in its first decade it bears no fruit, for it is storing up within it the possibilities of centuries; and so we do not look for fruit from you at once. It may not be in this generation, but all the same, your instruction will make itself felt in the end, if to your art you are but true."

Another factor in the apparent failure of agricultural colleges has been the lack of appreciation on the part of those they are especially designed to benefit. We are told that there was once a man, who, wanting to learn for what profession his son was best adapted, finally hit upon the expedient of shutting him up in a room with a Bible, an apple, and a dollar bill. For he reasoned thus: If on his return, he found him reading the Bible, he would make a minister of him; if eating the apple, a farmer; and if playing with the dollar bill, a banker. Well, as the story goes, when he returned, he found the boy had solved all difficulties. He had pocketed the dollar bill, had eaten the apple, and was sitting on the Bible. Recognizing the eternal fitness of things, the anxious father immediately made a politician out of him.

It has seemed to me that this is not an inapt description of

*The latest information makes France spend for the encouragement of agriculture yearly, $8,000,000; Austria, $4,000,000; Germany, $2,850,000.

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the way in which many an unlucky youth has been placed in a profession for which he was no more fitted than the ordinary mortal is to fly. Too often chance and haphazard have guided the choice, while with a serene reliance on the hand of Providence to smooth away all the difficulties that may arise, the unhappy tyro has been launched on his career of usefulness.

The draft horse is not fitted for a trotter. His build and make-up unfit him for a light and speedy course over the ground. And so of the boy. His talents and natural instincts may lead him in some other direction. Then why spoil a good mechanic, or engineer, or teacher, by making a poor farmer? or a good farmer, by making a poor minister? All that is good in one, is likely to be stirred and brought out by what he is interested in, while on the other hand, task labor just as surely stunts the soul and leaves its finer feelings dormant.

Do you remember in that beautiful tale of Sir Walter Scott, "Red Gauntlet," the trial of skill that took place between Wandering Willey, the blind fiddler, and young Darsie Latimer, the hero of the tale, and how, when the latter had executed a most brilliant and difficult passage, the old man quietly took the bow and after imitating his style in a very laughable manner, administered the following rebuke: "But for a' that, ye will play very weel wi' a little practice and some gude teaching. But ye maun learn to put the heart into it, mon, to put the heart into it."

My friends, farming is like everything else, — unless you put the heart into it and approach it with the enthusiasm you do the other professions, you will certainly be left behind in the race of life; for it will become your task-master and you, its reluctant slave.

If the agricultural colleges should accomplish nothing else than to awaken in the farmer a love for his calling and stimulate him to put forth his best efforts, efforts arising from the very depths of his heart, they will have taken the very first step towards bettering his condition.

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An idea advanced in a recent address on horticultural education by one of the teachers in Boston, has seemed to me worthy of consideration. He says, "A large majority of our public schools have done little or nothing in the study of plants, insects, minerals, and soils, alleging that such studies are not practical." What is the opinion of agriculturists on this matter? Are not potatoes and wheat practical things? Is there anything theoretical about the potato bug and the currant worm? Anything psychological about loam and phosphates? Anything allegorical about the codling moth and the peach tree borer? And then he proceeds: "For years past we have been reaping the natural results of a system of education, that, intentionally or unintentionally, turns all our young people for a livelihood toward the occupations of teachers, college professors, lawyers, physicians, clergymen, bookkeepers, salesmen, musicians, artists, agents, and business men, under which head, multifarious and heterogeneous legions of middle men are pleased to class themselves. These men have had the control of educational affairs, and they have kept the schools turning out their kind so long, that there is unquestionably in this country, an overwhelming surplus of middle men, non-producers and men living by their wits. Such a surplus is certain to make trouble. All are determined to live in affluence if possible — genteelly at all events.

"Consider what studies have been introduced in the common school curriculum within a comparatively few years — sewing, cooking, manual training for boys, kindergartens, and various modifications and better adaptations of every branch of study. Kindliness to animals has been advocated in all the schools of the commonwealth. The temperance people have had a compulsory school law passed. Instructors in hygiene have been employed. The entering wedge of the Sloyd system of manual training has been admitted. A mighty conference of the leading spirits in educational training has been held in Huntington hall and the representatives of various religious denominations have waged a war of words, con-

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cerning the teaching of history and religion in the schools. Among all these things advocated, there has been no suggestion of agriculture, but during their advocacy much has been said about sending the whole boy to school, when apparently what the whole boy is has not been determined. His earthly part, or rather his relation to the earth, has been entirely left out."

The old medieval idea of a scholar was one who did not have flesh enough upon his bones to hide an indecent exposure of his soul. Thank fortune! that idea has exploded, and the man of large brain has learned to feed his body generously and strongly that it may form a proper framework for the living soul. Bone and muscle of the body are the fit accompaniment to the brawn and sinew of the intellect, and the strong, healthy body goes hand in hand with the strong, healthy mind.

The idea—too prevalent, alas! even in recent times—that any one could be a farmer is also gradually dying out, and the world is learning that to be a successful farmer requires as much genius and knowledge, as to succeed in any other one of the professions. The story told by George Eliot, in the "Mill on the Floss," only too well reflects the contemptuous opinion held by farmers themselves, that anything in the way of an education was good enough for a farmer. It is farmer John who speaks. "What I want," said he, "is to give Tom a good eddication; an eddication as ud be bread for him. That was what I was thinking of, when I gave notice for him to leave the academy at Lady Day. I mean to put him to a downright school at midsummer. The two terms at the academy ud ha done well enough, if I'd meant to make a farmer of him, for he's had a fine sight more schoolin' nor ever I got. All the learnin' my father ever paid for, was a bit of birch at one end and the alphabet at the other."

Yes. A bit of birch at one end and the alphabet at the other! That has been about the idea of what was needed, and the old paradox was devoutly believed—

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"That the man who couldn't write his name
Was the man who made his mark."

Why! the fact is that agriculture deals with a larger number of problems in the mysterious forces of nature, and problems that are more vital, than any other science whatsoever. All the other sciences minister to her, for she is the mother of all. The great Liebig said, "There is no profession which for its successful practice requires a larger extent of knowledge than agriculture, and none," he goes on to say, "in which the actual ignorance is greater." Carey in his "Social Science" says, "Of all pursuits of man, agriculture is the one requiring the highest degree of knowledge." So Xenophon, "Agriculture is the nursing mother of all the arts." It was the gifted Newhall, who, looking forward with prophetic eye to the day when the scientific practice of agriculture would prevail, exclaimed: "The intelligent farmer will then regard the atmosphere as the vast magazine and storehouse of those materials from which the organic parts of animal and vegetable life have been derived. He sees by chemical light the invisible carbonic acid elaborate and assimilate to the different forms of being, while he knows that from the soil, the inorganic portion of the vegetable frame is obtained. And in the wondrous round of growth and decay, he perceives that nothing is lost on the dissolution of organic life. One part returns to the earth, and the other flies to the atmosphere in the form of gas, ready to enter into new combinations of animal and vegetable life. Thus growth, decay, and putrefaction will be to him but links in that endless chain of motion going on around us. There is no death. For out of death comes life, and death is but the commencement of living force in some other form."

"See dying vegetables, life sustain.
See life dissolving, vegetate again.
All forms that perish, other forms supply.
All served, all serving; nothing stands alone,
The chain holds on, and where it ends — unknown."

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In his Principles of English Agriculture, Wrightson says, "Agriculture is not chemistry any more than chemistry is agriculture. Agriculture is statistical, while chemistry deals with compositions and there is abundant scope for chemical investigation whether considered in its bearings upon the composition of soils, the ingredients of the ash and of the tissue of plants, or the nutrient value of seeds and feeding stuffs, the composition of the increase of fatting animals, or the genuineness of substances offered as fertilizers. In all of these we see the immense value of chemistry and of chemical knowledge. Again all questions connected with the nutrition of plants and animals, the sources of nitrogen, or the processes by which crude and mineral and organic matter are converted into available plant food, are eminently chemical qualities, to be decided by analysis and the balance. Now in the same way it would not be difficult to show the vast opportunities of other sciences as well as of chemistry in relation to agriculture. What, for example, can be more important than the bearings of botany upon the pursuit of agriculture? The ramification of the roots of plants, the fertilization of seeds, the knowledge of plants which may be introduced, the identification of injurious plants either in the form of pernicious weeds, or it may be in tracing the life history of those cryptogamic or fungoid forms which so often are the cause of loss to the farmer, as, for example, the potato disease and other blights and mildews which effect our crops.

"Scarcely less important is the subject of physiology, dealing as it does with the functions of animal and vegetable life. So, also, it would be difficult to convey anything like an adequate idea as to the history and attributes of soils without imparting a good deal of knowledge which belongs essentially to the science of geology. While the natural sciences are of prime importance in solving difficulties and suggesting improvements, it can scarcely be denied that the great subject of agriculture requires for its full explanation a knowledge of mathematics, engineering, and physics; and there is, perhaps,

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scarcely a branch of human knowledge, which might not easily be shown to have a practical and important bearing upon the usages and customs of agriculture. Take, for example, meteorology and even astronomy. Consider for a single moment the influence of the sun as a factor in the germination of seed, and then reflect upon the nature of sun-heat and sun-light, and we shall find that plant and animal life are intimately connected with the phenomena essentially belonging to the domain of the physicist, the astronomer, and the electrician."

The fact is that in order to teach the theory of agriculture, a whole faculty is required, just as much as in the teaching of medicine, of law, or of divinity. It is too much to expect one man to grasp the whole of this world-wide subject,— and therefore, in any agricultural college, it is necessary that chairs should be established for the teaching of chemistry, physiology, geology, anatomy, physics, and mathematics. The teacher of agriculture can do little more than indicate the points of contact between his own great subject and the sciences which surround it, leaving the explanations to those into whose domain they properly fall.

With this broad definition of agriculture — itself a science, complete in itself, yet touching all sciences and all branches of knowledge — and taking as our guide the law that the teacher of agriculture can but indicate these points of contact and leave to others their explanation, we have endeavored to rear our superstructure of agricultural education. Agriculture our foundation. Botany, chemistry, veterinary, and mathematics, our four corner stones, while the walls are built up with horticulture, market gardening, and forestry on the one side; physiology, entomology, and comparative anatomy of the domestic animals on the other; mechanics, physics, and meteorology on the third; and a study of the English language, political economy, and constitutional history the fourth. These five courses, each distinct in itself yet each aiding in the interpretation or solution of the difficult problems met with, require a four years' course. They pro-

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ceed hand in hand, and the completion of a study in one department is coincident with that in another. Mutual help is the watchword. Each for all and all for each in the laying broad and deep the foundation, and building up the solid structure. Thus when the relations of the weather—of heat, air, moisture—to farming are considered, on the botanical side are being studied the structure of the plant, its organs, the relations of its root system to soil and moisture; on the chemical, the elements important in an agricultural point of view and their properties; and in mathematics, such algebra and geometry as will lead on to practical work in surveying and drainage. So too, when soils and tillage are considered, in like manner are studied, plants beneficial or injurious to man, general geology, and those insects hurtful or otherwise to the crops. In short, the effort is made to have each course supplement and be in harmony with the other, and the different studies so fit into each other as to make one rounded whole.

Do these studies seem to you too many, or perhaps not bearing strongly enough on the main subject? Consider for a moment the magnitude of the interests involved, and then say whether the end does not justify the means. The study of "bugs," as the average man puts it, seems but a trivial thing, but damage to the amount of $200,000,000 it is estimated is annually done to our crops by insects, and the farmer is apt to look upon each of the myriad crawling, creeping, jumping, flying things as a personal enemy, falling under the original curse and to be exterminated at all hazards. In the present condition of his knowledge the only alternative left him may be suggested by quoting the brief, comprehensive, but very intelligible address of a colonel when leading his regiment into action, "There's the enemy; if you don't kill them they'll kill you." There was a time when the potato bug as it started on its devastating mission from the far West could have been stopped. The alarm was sounded by Western entomologists and Congress was asked to appropriate a sum for its extirpation, but the petition was

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sneered at. To-day it is costing the farmers of Massachusetts $80,000 annually and the farmers of the United States $2,000,000 annually to hold it in check, by the use of Paris green.

The only effectual way of combating the insects whose name is legion, is by studying their life histories, following them through all their transformations up to the perfect insect and learning their habits and methods of attack. They have their diseases as well as animals of larger growth, and it is quite within the bounds of possibility, that we may yet be able to inoculate them with some disease, the measles or plague perhaps, that will sweep them away by the millions. Think what a boon that would be to the harassed grower of tobacco, or raiser of potatoes! But a short time ago, the orange groves of the Pacific slope were threatened with destruction by the ravages of a scale bug, which in spite of every effort was ruining the trees. The entomological department at Washington sent a commission to Australia to study the habits of the pest in its native haunts. It was found that a lady bug was its deadly foe and an effort was made to send colonies of them to this country. On the 30th of November, 1889, twenty-eight arrived; on the 29th of December, forty-four; and on the 24th of January, 1890, fifty-seven, — in all one hundred twenty-nine. These were placed on an orange tree infested by the scale bug, a tent being placed over the tree to confine them in one place. Before the following April they had killed all on the tree and had multiplied to such an extent that one side of the tent was raised and they were permitted to spread and carry on their good work. The orchard was cleaned in a brief two months and in June colonies numbering 10,555 individuals were sent to 208 localities, in every case proving a complete success, clearing the trees and spreading to neighboring orchards. This is but a single instance of the work accomplished by the trained entomologist in combating one insect by introducing another to prey upon it. The discovery of a parasitic fungus, fatal to the life of the clinch bug, and its successful introduc-

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tion into fields of wheat which were rapidly being destroyed, bids fair to be the means of saving our farmers in the West millions of dollars.

Physiology, anatomy, and zoölogy might seem to be unnecessary, but they all lead up to a proper study of veterinary, and that involves the proper health and care of the domestic animals. Census returns give their valuation in this country at over $2,400,000,000, and it is computed that there is an annual loss of six per cent resulting from disease, much of which is preventable.* Is not this a proper field for the agricultural colleges, and is there no lesson of value that can be brought home to the farmer in the improved condition of his stock?

Unable to compete with the West in the great staples, those crops are being raised that will bring the quickest substantial returns, such as dairy products, small fruits, and market garden produce. To show how to develop along these lines, how to secure an increase in quantity of farm products, how to improve the quality, how to raise better fruit, better vegetables, better stock, is the mission of the agricultural colleges.

It was President Clark, who, speaking of meteorology, said: "The study of the great forces of nature, which are so intimately connected, and which produce the infinite variety of changes in the forms and qualities of matter constantly occurring within and around us, is of the utmost importance. The heat, light, and chemical forces, which exist, united mysteriously in sunshine, are the power upon which agriculture is especially dependent. In the mass of the earth, sunshine produces electricity and magnetism. In the atmosphere, those currents which mix and temper the constituents of the air, and furnish a most valuable motive power; while from the ocean is raised in the form of invisible vapor the moisture, which descending as dew, rain or snow, refreshes vegetation, feeds the springs and streams, or clothes the earth in

*In 1890, the loss from disease varied from 1.6 per cent with horses, to 7.6 per cent with swine.

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its wintry mantle. This process of evaporation also unites the elements of ammonia to furnish the indispensable stimulus of plant growth, while the watery vapor in the air around and above us, shuts in, like the glass of a plant house, the obscure heat of the earth, which would otherwise be radiated into space so rapidly as to render the climate of New England inhabitable. To understand what sunshine is and does, is, therefore, essential to intelligent, scientific agriculture."

Again, the whole subject of wastes, of what crops it will pay best to grow, what exhausts the soil, and what does not, how to feed and what to feed, and how long to feed in order to fatten at a profit, and when to sell, these are questions that have risen into first importance, and any instruction that will enable the farmer to put forth his efforts more understandingly and intelligently must be of the greatest value. The penny saved is tuppence gained, and the tuppence gained is just what makes the difference between poverty and comfort. To be successful in these days of sharp competition, we must know "how to feed the land while the land feeds us." To raise the largest amount on a given area at a minimum cost is the problem most are struggling with. Have not your own college and station commended themselves to your favorable regard in the carefully worked out formulæ which they have published of the best proportions of bone black, muriate of potash, and sulphate of ammonia for corn, wheat, oats, ensilage, hay, and potatoes? Commissioner Harris never made a truer remark than when he said: "There is a minimum of originality and inventive power on the part of the agricultural populations of the entire world. They are the most conservative of all people. The agricultural college has a great career to make in this line, because there is so much to be done. The coming in of the laboratory in the form of the agricultural experiment station is the point on which the agricultural college is wheeling around to lead in this, the greatest work of American education." The increase per acre of one single bushel, to the yield of wheat, corn, and oats, in this country would make an increase in the value of

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those crops alone of over $164,000,000 a year, which would be more than doubled by a similar increase in other crops, and this can be easily accomplished by the use of seeds of varieties, carefully tested. In France, in one district, the yield was raised from thirteen bushels per acre from local varieties, to forty-eight bushels from a foreign variety, carefully selected and tested at one of the experiment stations. Blount of the Colorado Experiment Station has demonstrated the same thing, having raised wheat at the rate of 100 bushels to the acre.

The loss of manure in the Commonwealth of Massachusetts has been estimated at $2,000,000 annually. If but one half of this could be saved and applied scientifically, who can estimate the additions to the product of the soil? It has been proved at the New York Station, that the value of the solid and liquid manure produced by dairy cows is equal to forty per cent of the market value of their food and that the value of the liquid part is sixty-one per cent of the total value of the manure; that the annual cost of the food of a dairy cow is $52, and the relative value of manure produced is $36.40. Is it nothing to teach the farmer that sixty-one per cent, or about $22, of this amount commonly wasted can be saved? Too often has he looked upon the ammonia as not worth attending to, but viewed in the light of dollars and cents, or the credit and debit side of his ledger, it becomes an interesting, practical point.

Grandeau has gone still further and estimates that a single year's crop in France represents 298,200 tons of phosphoric acid, of which only 151,200 tons are received from stable manure, there being a deficit of 147,000 tons, equal to about 1,000,000 tons of superphosphate to be made good. These are but isolated facts. But it is from an aggregation of facts that laws are deduced and principles laid down which can be of use to the farmer. It is the especial province of the agricultural colleges to take up and carefully investigate these difficult problems.

The farmer has gone on in the good old way raising his

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hay and feeding it out to his stock, careless of the manurial value returned to the soil, careless of the amount of food constituents contained in it, careless of the question, whether it would pay him better to feed out that crop or some other. His fathers had pursued this course before him and had lived comfortably. Why should he change? To-day, to use a single illustration, the question stands something like this:

Twelve dollars paid in the market for either of the following fodder articles will procure the following number of pounds, containing the following amounts of food constituents:

	Weight of article.	Manurial value.	Net cost of fodder.	Food constituents in fodder.		
				Proteine, pounds.	Fat, pounds	Carbohydrates, pounds.
Corn meal	1,200	$4.50	$7.50	118	46	835
Wheat bran	1,412	10.50	1.76	224	58	748
Wheat middlings	1,200	6.45	5.55	198	50	755
Gluten meal	1,000	8.50	3.50	290	61	539
Cotton-seed meal	923	9.11	2.89	358	114	237
Linseed meal (O. P.)	889	9.67	2.33	295	46	333
Linseed meal (U. P.)	960	11.52	0.48	.....	.....	.....
Timothy hay	2,000	5.50	6.50	141	42	946
Corn stover	4,800	11.52	0.48	330	84	2,197
Sugar beets	4,800	2.76	9.24	92	5	299
Mangold wurtzel	8,000	4.40	7.60	102	9	703
Skim-milk	6,000	6.75	0.25	107	13	282

Which is the cheaper? Shall he go on using timothy hay, or corn stover, or cotton-seed meal? or what combination will he find best, of, say, one half corn meal and one half corn stover resulting in *e. g.*

	Weight of article.	Manurial value.	Net cost of fodder.	Food constituents in fodder.		
				Proteine, pounds.	Fat, pounds	Carbohydrates, pounds.
One half corn meal	3,000	$8.01	$3.99	224	65	1,677
One half corn stover	3,000	8.01	3.99	224	65	1,677

All these are questions of the utmost practical value to the farmer, which college and station alone can solve. One more

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illustration drawn from feeding and I will conclude this portion of my lecture. The farmer fattening pigs for the market does not realize when he disposes of his three or four hundred pounds of porcine monstrosity that it has been at a loss and not a gain to himself; that up to one hundred fifty pounds he has been putting on flesh at a minimum cost, but that above that, pound for pound he has been increasing his outlay and diminishing his profits. Yet the minimum cost of fattening has been carefully worked out by experiment and practical instruction on this most important subject given at the colleges. Is it nothing to teach the farmer as a late report from the Wisconsin institute does, that we do not exhaust land by selling the fat of animals, but we exhaust when we sell their muscle, their bones, their hair, their skin, and horns? We exhaust land when we sell milk, cheese, or eggs, but not when we sell butter. If we sell $200 worth of wheat, we sell $48 worth of plant food from the soil. If we sell a horse worth $200, we sell $7 worth of fertility; while if we sell $200 worth of butter, we sell less than $1 worth of plant food. Are not these figures well worthy of the agriculturist in determining what he shall grow for market?

But why go on enumerating studies and presenting illustrations, the value of which must be apparent to every thinking mind. Our only trouble is that within the compass of a four years' course we cannot introduce all those branches that seem to us important, and we are continually in danger of overtaxing the student.

Now for a farmer to have a thorough knowledge of his profession and be able to do it skillfully and profitably, he must learn two things:

"1. What to do; how to do it; and when to do it.

"2. He must acquire the manual skill to do it and to do it well. The first, or the what, the how, and the when, constitutes the science of agriculture. The second, or the manual skill, the art. The first he learns at the college. The second must be learned at home." For the time of the student is too valuable to be spent in plowing and hoeing. It is rather to

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learn why to plow and hoe at all, and when and where to do it to the best advantage that he goes to college.

But what is the value of agricultural education? What is the use of an agricultural college? We are reminded of the great scientist, Faraday, who when questioned as to the usefulness of his discoveries was accustomed to reply, "Of what use is a baby?" It is nought now, but who can estimate the possibilities that lie stored up within the clutch of its tiny hand? Let us turn for an instant to those countries where it has longest been pursued and see what have been its results. France, with 37,400,000 inhabitants, supports a population of 184 to the square mile, and has 18,200,000 engaged in agricultural pursuits. Germany, with 45,200,000, supports a population of 213 to the square mile, and has 18,800,000 engaged in agricultural pursuits. Great Britain, with 35,200,000, supports a population of 291 to the square mile. In Germany the almost universal testimony of those in charge of the schools, is of the beneficial effects upon the peasants. Better rotations have been put in practice, hand-labor has given place to improved machinery, the number of acres under cultivation has been multiplied, the product per acre has increased twofold, a great variety has been added to the list of products, and the adaptation of crops to soil has been more carefully studied.

France has become a vast garden, "the best cultivated country," according to the Banker's magazine of New York, "in the world; whose revenue from its land alone is estimated at $550,000,000," and whose exports in 1884, of articles of food and cereals, footed up to $165,302,200, and its wines to $47,450,000 more. Its agriculture certainly pays, for one half of its population are engaged in its pursuit. Next to the United States and Russia it has become the greatest wheat-producing country in the world. Its forests, carefully superintended by pupils from the great school of Nancy, yield it an annual revenue of $50,000,000. The denuded slopes of the Alps and the Pyrenees, down which poured the mountain torrents, filling up and covering over the fertile

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plains with coarse debris, have been covered with smiling verdure to their very summits, and the waters have been led captive into the channels prepared for them. The sand dunes on the west coast, advancing at the rate of 14 feet per annum, and transplanting inland 90 cubic yards of sand per yard of coast line, have been arrested in their course, and 224,154 acres have been reclaimed and covered with trees and shrubs.* The cultivation of the sugar beet, carried to the highest perfection, has twice saved the country from national bankruptcy.

In England fifty years ago, the normal yield of wheat per acre was thirteen bushels, the latest returns make it 31.24 per acre. So, too, the hay crop. By a judicious use of fertilizers, Messrs. Lawes and Gilbert have raised the yield per acre from 2,300 pounds to 6,400. The barren plains of Norfolk, stretching for miles their sandy wastes, with here and there a stunted growth to mark the effort of nature to reclaim them, have been transformed into broad fields of life-sustaining crops; and the fens of Lincolnshire, reeking with malaria, have been changed into the granary of England.

A writer in one of our daily papers only a few months ago, says: "The present drawbacks in New England farming are the neglect of farmers to have their sons take advantage of the almost free agricultural schools instituted for their benefit; their want of mechanical and chemical intelligence so necessary in agriculture; their unmethodical methods, carelessness of machines and tools; their imperfect production in dairy results; their waste of materials; neglect of social intercourse; improper diet and too much hesitation in taking their proper position, coördinate with other citizens in regulating the affairs of the country, and urging forward all such reforms as civil service and the new ballot."

In a word then, the agricultural colleges have as their mission the elevation of agriculture into a wealth-producing industry, and they aim to do this by teaching four things:

1. To teach the farmer how to experiment.

*Consular Report. Forestry of Europe, 1887.

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2. How to produce at the least cost, abundant agricultural commodities of the best quality.

3. How to dispose of these commodities to such an advantage that a reasonable reward for labor may be enjoyed.

4. How the farmer may as a class attain the highest culture, so that their best development shall carry with it the promotion of the welfare of the other classes of society and of the whole nation.

But more than all this the colleges should be the great distributing centres of information to the entire agricultural community — the medium through which the collected knowledge of the world may be imparted to the farmer. Many years ago before an agricultural college was established, Professor Fowler turning from his study of the English grammar and its principles, exclaimed: "What we need is an organization, under authority of the State, which shall collect the scattered light, whether in this or another hemisphere, so that it shall become effectual, and not any longer be 'Light shining in darkness and the darkness comprehending it not.'" What we need is an organization which shall collect the light of science and of practical experience into an agricultural institution, as into a focus, from which it can go forth, as from a radiant point, over the commonwealth and the country.

MR. LYMAN: I would like to ask the Professor if there is any organization between the agricultural colleges of the nation with a systematic plan of the work that each should do laid out. And if there is not, I wish to ask if he does not believe that there should be a gathering of the representatives of the agricultural colleges to talk over and devise means by which they might, to a certain extent, coöperate with each other and by that means work harmoniously, thereby producing greater results to the nation?

PROF. GOODELL: Yes, sir. And there is an association of that character. The Association of American Agricultural Colleges is for that very purpose. We meet together once a year and decide upon all such questions. We have been in existence now only three years and so we are not

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fairly in working order, but that is the purpose of the association. I might say right here that in connection with the World's fair that is to be held in Chicago, the committee in Chicago consisting of Mr. Butterworth, Judge Boönor, and two other gentlemen have been in consultation with the executive committee of the agricultural colleges of the country in order to bring about a congress of the agricultural colleges of this country and of the world, in order that we may learn from them what we can with reference to agricultural education. I not only hope but believe that it will finally be of immense value to the country at large.

MR. LYMAN: I wished to know if it was at present doing what it ought to do. It was one of the strangest things to me why Congress did not provide for such harmony in the work. Way back in 1852 it appeared to me that was one of the essential things. It appeared to me that by that means the usefulness of colleges might be increased.

PROF. GOODELL: We have had a good deal of work on our hands in fighting our way. We have had to fight our way through Congress and elsewhere. You are doubtless aware that in almost every State there was, at the outset, a remarkable hostility to the colleges. Just at present we are engaged in carrying measures through Congress and in getting upon our feet.

PROF. BREWER: There is one point which I think is not appreciated, and that is the marvelous rapidity with which stations' work has sprung up. Where is there any other movement in the United States of any such magnitude, that has grown so rapidly? How long ago was it that the mass of farmers first knew anything about this work? Only a few years ago. And now they are in every State and territory of the Union; and it was simply impossible but what a good deal of experimental work had to be done and done separately by the different stations. A good deal of work was done that was not done in the best way. But I do think that experiment stations are getting better and agricultural colleges are working in better form. I think we are getting along pretty fast.

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PROF. PETTEE: I want to say just a word. I might perhaps add to what Professor Goodell has said, that he is the president of our association at the present time. At the last meeting which was held at Champaign, Ill., New Hampshire had next to the largest representation of any State, and I am sure that the good that will result from having that large number of representatives and trustees present has been felt already through the State.

The object of this association, as President Goodell has said, is, first to get upon our feet; secondly, it is to result in bringing together the workers in our experiment stations and in a coöperation of the work. Of course there are difficulties in the way of bringing this about entirely. Each one in its own individual State has its own work to do and it is impossible to tie any particular State up to any international rule. It is found, however, that by getting together and talking over matters and directing as far as we can this coöperation of work, great good may be accomplished. To a certain extent quite a large amount of repetition is necessary on account of the different conditions that exist in different parts of the country.

PROF. BREWER: State laws also have something to do with it. A great part of the work that is done in these stations is done in obedience to specific laws. The State of Connecticut has a fertilizer law. At the time that law was passed in the State, the farmers came forward and testified that they were expending $100 per acre per year on commercial fertilizers. The amount spent in a single township exceeded $100,000 per year. We had to do something to protect ourselves against frauds. There was on the market at that time some goods that were utterly worthless, if not positively harmful. The state fertilizer law is of the kind that demands that the fertilizers shall be tested by the station. That makes a good deal of labor. Then there is the oleomargarine law, etc. There are frequently specific state laws which dictate in part the work to be done by the station. There is an enormous amount of work that could be done in coöperation, but the policy of the various state institutions

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cannot be controlled, particularly where the States make liberal appropriations for their local institutions. I say that in explanation, because it has been inquired why there was not more coöperation.

MR. WALKER: I suppose we have arrived at the end of this session, and as far as I am concerned, I have been reluctant to get to this point. When I saw the programme that was handed to me by Mr. Bachelder and saw who were going to speak to us from abroad, I made up my mind that I would so arrange my affairs, if it were possible, that I might be here. I have been here during the last two days as much of the time as possible, and I have been packing away in my mental barrel as much of the solid meat as I could well salt down, and I intend to draw upon it hereafter.

There is one thing that is not on the programme that ought to be. I think that we owe something to these people from our neighboring States who have come in here and given us such valuable information. As I have listened to their papers, this thought has come into my mind: Supposing these gentlemen had come here twenty-five years ago and had read these same papers, how much of them should we have understood. It is a matter of great gratification to me that we have arrived at the point where we can understand and get some benefit from papers of this kind. If you go back twenty-five years I do not think that these papers would have been listened to.

I think that we owe these gentlemen, one and all, our hearty thanks, if nothing else. I hold in my hand a resolution which I have drawn up and I would like to present it to this meeting:

Resolved, That our thanks are due and are hereby tendered to the distinguished speakers from Massachusetts and Maine for the exceedingly valuable and interesting papers which they have read before this institute, and that copies of the same be solicited for publication in the transactions of our honorable Board.

The resolution was unanimously adopted.

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MR. LYMAN: I wish to say just a word here. Last night I went to the room where they were having a hearing before the railroad committee, and the matter in dispute was the top of Mt. Washington. The hotel people wanted it, and the railroad wanted it, and there was a mighty contest going on between the two. It is considered, as I understand the matter, the most valuable piece of rock there is in New Hampshire. Yet in 1863, when I was first a member of the Legislature the question was raised incidentally as to who owned the summit of Mt. Washington. There seemed to be no means of knowing whether the State owned it or not. I was the only man in that Legislature that cared enough about it to get mad. No other person seemed to care whether New Hampshire owned it or not. Now it would be a fortune to anybody. I mention this to illustrate the growing prosperity of New Hampshire, as far as the tourist business is concerned, at least.

The session then adjourned.

GRAFTON COUNTY.

PIERMONT.

The Board held an institute at Piermont, March 13, at which were present President Humphrey, Vice-President Philbrick, Alonzo Towle of Freedom, F. P. Covell of Colebrook, and Secretary Bachelder.

The subjects discussed at the afternoon session were "Hay Production," by Mr. Covell and "Horse Breeding for Profit," by Dr. Towle. Each was followed by a discussion in which much interest was manifested. At the evening session President Humphrey spoke upon the subject of "Corn Growing," and Vice-President Philbrick, upon "The Dairy." The secretary participated in the discussion which followed. A deep interest in the institute was manifested by those in attendance and it was regarded as one of the most successful.

N. J. BACHELDER,
Secretary.

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REPORT

OF THE

COMMISSIONER OF AGRICULTURE AND IMMIGRATION.

CONCORD, November 1, 1891.

To His Excellency the Governor:

Under date of January 1, 1890, a pamphlet was issued from this office in reply to many letters of inquiry received in regard to the abandoned farms of New Hampshire. This pamphlet briefly stated advantages to be derived by locating in our State, contained descriptions of abandoned farms for sale, and reached a circulation of eight thousand copies, being sent to every State in the Union, and even to several foreign countries. In August, 1890, one year from the commencement of this work, at our request a canvass was made by the selectmen of the towns in regard to the work accomplished, and the result published in our first report to the governor and council, under the date of August 12, 1890. In this report it was demonstrated that the results contemplated in the passage of the law under which this action was taken had, in a measure, been accomplished. Over three hundred vacant farms had become reoccupied, mainly by Americans for summer homes, and the summer boarding business largely increased through the means which had been employed.

Since this report was issued the work has continued and additional farms have become reoccupied; hundreds of letters of inquiry have been received.

The statement made in our previous pamphlet, that the

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population of New Hampshire was annually increasing, has since been verified by the official census, giving the present population at 375,827, a gain of 30,000 since 1880.

The wealth of the State is annually increasing, and the advantages of a home in New Hampshire were never greater than to-day.

Our savings banks, the usual place of deposit of the surplus earnings of laboring people, have had a remarkable increase in deposits during the past year. By the report of the bank commissioners the aggregate deposits of the seventy-two savings banks, September 30, 1890, were $65,727,019.04, an increase since the last report of $8,426,428.56, the largest increase ever made in a corresponding period in the history of the savings banks of New Hampshire. In addition, the savings banks doing a general banking business and the trust companies showed on that date $1,045,208.66 of savings deposits, giving a total of $66,772,227.70 savings deposits in the savings banks and trust companies of the State. The total number of depositors was 159,782, and the average to each depositor was $411.35. If the deposits of the savings banks were equally divided among the population of the State, the division would give to each individual $175 in round numbers. The average last year to each depositor was $395.12, and to each inhabitant, $161.41

New Hampshire possesses a vast natural water power, and along the lines of our rivers and large streams have been built up some of the most thriving cities and villages in the world. These are continually adding to their business and wealth, and afford a constantly increasing market for farm products of all kinds. There are yet many undeveloped water powers within our State, which only need the investment of capital to build up still other manufacturing centres.

The educational advantages of New Hampshire are unexcelled, and the puritanical character of the people of our rural towns affords the most intelligent and exemplary society to be found anywhere. The healthfulness of our climate is well attested by the fact that fifty thousand people annually

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NEWFOUND LAKE.

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come from other States to spend the summer months within our borders for recuperation of body and mind.

Numerous agricultural organizations are zealously engaged in promoting more intelligent cultivation of the soil, and have elevated the business of farming from mere drudgery to that of an honorable and respected vocation. The variety of soil to be found in New Hampshire admits the culture of all farm and garden products adapted to this climate. Dairying is a leading branch of agriculture at the present time. Forty creameries, located in thirty-six towns, are making about three million pounds of butter annually, which is in good demand. New Hampshire dairy products now command a reputation in Boston market second to those of no other State. Several milk routes extend to various sections of the State, on which cars are run daily to Boston market with milk and cream.

Horse breeding is receiving much attention, and the demand for superior horses is now largely supplied by those of our own production.

The poultry business is a profitable farm industry, and many abandoned farms have already been utilized for this purpose.

In the production of fruit New Hampshire takes a prominent place among the States of the Union. New Hampshire grown apples have a national reputation, and are sought after in the foreign markets for superior quality and flavor.

There is a grand opening here for people desiring to engage in the summer boarding business, and many farms are specially desirable for this purpose. Fourteen hundred summer hotels and boarding-houses are annually filled to overflowing and are unable to accommodate the vast number that desire to spend the summer months among our granite hills. This industry brings to our State annually more than $5,000,000. Thus it will be seen that the markets afforded by the manufacturing cities and villages, the summer boarding industry, the creameries and milk routes, all of which have been made more available by the recent extension of rail-

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roads, render the farms of New Hampshire specially desirable for agricultural purposes.

Many of the farms taken up during the past year have been purchased by city people for summer homes, and many more will be taken in the future for this purpose. The buildings on many of them are large and roomy, and with little expense can be fitted for a delightful home during the summer months. Many of these farms are upon hilltops, commanding fine views of intervales, ponds, and streams, and are surrounded with the grand New Hampshire mountains. Some of them are located upon the borders of lakes and ponds, where will be found most satisfactory rest and quiet, with fishing and hunting in abundance.

The State supports five fish hatcheries, from which during the past year 1,756,000 young trout, salmon, and bass were deposited in our lakes and streams.

In addition to the grand natural attractions of New Hampshire, the fame of which is world wide, there has been recently established in the central part of the State, by Austin Corbin, of railroad fame, one of the most extensive private parks in the country. Twenty-one thousand acres, embracing part of Croydon mountain, in Sullivan county, have been enclosed with a wire fence, and include the territory once divided into fifty farms. Within this inclosure have been let loose deer, caribou, moose, buffalo, and wild boar, in all about one hundred animals. Large additions will be made to this number, and this park will doubtless become an object of great curiosity to visitors. Ossipee Mountain park, in Carroll county, is being beautified by large expenditures of money, and embraces hundreds of acres in extent. Smaller estates, scattered all over our State, are being beautified and improved by recent purchasers, and the time is fast approaching when New Hampshire will be one grand park, leading all sections of our country in providing desirable homes, her hills and valleys having as wide a reputation as is now accorded her lakes and mountains.

No feature of New Hampshire scenery is more attractive

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OSSIPEE LAKE. — OSSIPEE.

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or affords more genuine pleasure to the summer tourist than the magnificent lakes and ponds within her borders. About six hundred in number, scattered over the length and breadth of the State, of varying size, shape, and altitude, they attract the summer visitors as nothing else can do. They have been so abundantly stocked with various species of game fish that they afford rare sport for the fisherman. On the large lakes elegant steamboats are run for business and pleasure parties, while the fleet of the smaller lakes and ponds includes smaller craft in great variety, from the trim canoe to the primitive raft.

Cottages for summer homes are being built on the borders of these lakes. Densely wooded and rocky shores, dotted with attractive cottages, the only means of approach being by steamboat or canoe, afford an example of rural life which for rest and recuperation cannot be duplicated. Land for building purposes can be secured around these lakes for a trifling sum, and the cottages now built range in cost from one hundred to forty thousand dollars. Your attention is called by the illustrations in this pamphlet to the larger lakes of the State, around any of which a location can be secured. We are prepared to furnish the names of parties in any locality who will give definite information in regard to cost of land.

There are for sale in the State about one thousand vacant farms with tenantable buildings. Any one desiring a place in the country, either for agricultural purposes or for a summer home, has been invited to send for a catalogue containing descriptive list.

The list of summer hotels and boarding-houses herewith published will be found authentic, contains much valuable information in regard to this distinctive New Hampshire industry, and has been widely circulated. More than 17,000 pamphlets have been distributed during the past year.

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SUMMER HOTELS AND BOARDING-HOUSES.

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
ACWORTH.			
H. R. Neal	Mountain View	Acworth	12
Mrs. Charles Allen	Sunset Hill Farm	"	12
C. H. Blanchard		"	
R. J. Carey		"	
Abner G. Livingstone		South Acworth	10
Mrs. Amelia Mitchell	Mitchell Residence	Acworth	6
Charles Humphrey		"	
ALBANY.			
Mattie B. Davis	Front Dale	Albany	
J. N. Piper	Bear Mountain	South Albany	25
J. N. Shackford	Shackford	Conway	10
Richard R. Hill	Hill House	"	
James Mayhew	Carrigan House	"	12
Joseph Annis		"	8
David Hurley	Hillside Cottage	"	12
ALEXANDRIA.			
E. T. Bailey	Goldenrod Farm	Alexandria	20
Calvin Brown		"	20
N. G. Smith	Mt. Cardigan Cottage	"	14
Woodbury Sleeper	Elmwood Farm	"	20
A. F. Cheney	Willowdale Farm	"	6
G. A. Rollins		"	14
C. F. Wheet		"	
ALTON.			
D. E. Wheeler	Winnipiseogee Hotel	Alton Bay	80
George Craine	Hillside Cottage	"	25
Mrs. Clara A. Gilman	Cottage Hall	Alton	
Chester A. Twombly	Green Valley Lodge	Alton Bay	12
ALSTEAD.			
H. P. Chapin	Alstead House	East Alstead	30
G. G. Banks	Warren Pond House	" "	20
A. M. French	Ledge Side	" "	20
George E. Newman	Pine Cliff	" "	
Mrs. C. A. Partridge		" "	6
Fred Wright		Alstead Centre	
AMHERST.			
John Wallace	Maplewood	Amherst	
Frank W. Noyes	Lake Shore	"	15
William Colston	Baboosic	"	20
Mary Putnam	Soda Spring House	"	
H. C. Day	Rockland House	"	6
Pliny Odell	Walnut Hill House	"	10
John H. Dodge	Idlewild	"	15
S. B. Webster	Webster House	"	16
William Melendy	Quoquinnapassakassan-anaguog	"	30
A. S. Wilkins		"	10

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ASQUAM LAKE. — HOLDERNESS.

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
AMHERST. — *Continued.*			
Miss French		Amherst	10
F. L. Macomber	Pleasant View	Amherst Station	20
M. S. Batchelder	Tumbleton	" "	12
ANDOVER.			
H. C. Weymouth	Weymouth Farm	East Andover	
N. J. Bachelder	Highland Farm	" "	25
H. N. Burt	Maple Cottage	West Andover	25
F. H. Flanders	Hillside Farm	East Andover	18
F. G. Hersey		" "	
John F. Emerson		Andover	
Mrs. H. R. Fellows		"	
Mrs. Susan D. Curtis		West Andover	
Jonathan Cilley		East Andover	
ANTRIM.			
A. B. Crombie	Windsor House	North Branch	
Milton Tenny	Antrim	Antrim	50
C. F. Holt	Lake House	"	40
J. W. Bass	Willow Dale Farm	"	12
Charles G. Griffin		North Branch	30
J. F. Tenney		Antrim	18
Mrs. Whitley		"	
Mrs. L. Campbell		North Branch	
H. L. Lawrence		" "	12
John M. Duncan	Shady Knoll	Antrim	
L. T. Lovell		"	8
George F. Perry	Pinnacle	"	
H. W. Muzzey	Carter	"	10
Mrs. J. R. Symes	Hill Side Farm	"	20
Sam A. Holt	Tip-Top House	"	
C. R. Jameson	Mountain Side Farm	"	12
A. Colby	Mansion	Hillsboro' Bridge	15
ASHLAND.			
J. M. Cotton	Squam Lake House	Ashland	50
D. S. Batchelder	Batchelder House	"	40
R. T. Mills	Seven Pines	Plymouth	
Mrs. E. J. Hughs		Ashland	16
B. F. Pease		"	100
ATKINSON.			
William B. Keynolds	Maple Farm	Atkinson	15
Wyman B. Knight	Maple Place	"	12
James H. Noyes	High View	"	8
Samuel P. Foote		Atkinson Depot	
George P. Dow		Atkinson	
Mrs. Harriet Fernald		"	
Washington B. Wason		"	
E. M. Carlton		"	
AUBURN.			
Charles W. Calef	Calef Hotel	Auburn	50
Mary A. Murry	Hill Farm	"	25
Charles J. Esty	Maple Cottage	"	15
Benjamin Eaton	Eaton Hill Farm	"	12
George W. Pingree	Mountain View	"	20
Samuel Bradeen	Sheldon House	"	12
Irving F. Grant		"	
John Davis	Bunker Hill Farm	"	20
BARTLETT.			
John Pendexter	Langdon House	Intervale	50

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
BARTLETT. — *Continued.*			
Pitman Brothers	East Branch House	Lower Bartlett	125
Frank George	Bartlett House	Bartlett	50
Mrs. C. C. Pendexter	Pendexter Mansion	Intervale	60
C. A. Tasker	Fairview	"	
Mrs. H. A. Vickey	Pequawket	"	
Walter Pitman	Pitman Hall	Lower Bartlett	100
C. Steiphen	Steiphen	Centre Bartlett	
E. A. Stevens	Cave Mountain House	Bartlett	
Joseph Mead	Centre Bartlett House	Centre Bartlett	40
BATH.			
William Symonds	Highland House	Bath	25
A. N. Blandin	Elmwood	"	
Mrs. Hutchings	Old Stone House	"	20
W. D. Thompson	Central House	"	
Lucius Pierce	Elmwood	"	20
C. W. & M. E. Jackman		"	
BELMONT.			
Stephen Taylor	Bay View	Laconia	50
Frank A. Randlett	Forest House	"	35
P. Randlett	Randlett House	"	25
A. J. Young	Belmont Cottage	East Tilton	24
Henry Thompson	Highland House	Laconia	
G. H. Ingalls	Brown's Hotel	Belmont	30
BENNINGTON.			
J. C. Dodge	Dodge Farm	Bennington	40
J. E. Favor	Highland House	"	30
E. A. Holt	Holt Farm	"	20
B. D. Felch		"	20
BENTON.			
E. B. & E. F. Mann	Tip-Top House	Benton	
Mrs. C. C. Taylor	Breezy Hill Farm	"	10
O. L. Mann		"	
C. A. Veasey	Veasey Cottage	"	10
C. B. Keysar		"	6
Mrs. George Dagmon		"	
BERLIN.			
H. F. Marston	Berlin House	Berlin Falls	75
C. C. Knapp & Son	Winslow House	Berlin	
BETHLEHEM.			
Ainslie & Webster	Maplewood Hotel	Maplewood	400
John Hopkins	Avenue House	Bethlehem	300
C. H. Davis	Maplewood Cottage	Maplewood	100
J. N. Turner & Son	Turner House	Bethlehem	75
Durgin & Co.	Sinclair House	"	300
A. J. Phillips	Prospect House	"	80
D. W. Ranlett	Ranlett House	"	75
David Phillips	Bellevue House	"	85
— Eastman	Tamarack Cottage	"	
R. M. Hodgdon	Elm House	"	
J. B. Bean	Georgia Cottage	"	20
F. P. Moulton	Bethlehem House	"	
Mrs. S. P. Swett	Swett Cottage	"	
R. H. Gardner	Gardner Cottage	"	
Mrs. D. F. Davis & Son	Hillside	"	50
A. W. Blandin	Blandin House	"	30
H. Nye	Mount Agassiz	"	
W. H. Presby	Woodlawn House	"	25

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MASCOMA LAKE. — ENFIELD.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
BETHLEHEM.—*Cont'd.*			
I. A. Taylor	Mountain View	Bethlehem	20
F. H. Abbott	The Uplands	"	100
J. H. Clark	Highland House	"	
C. H. Clark	Alpine House	"	60
L. M. Knight	Centennial House	"	60
A. S. Phillips	Farm Cottage	"	
G. A. Gilman	Garfield Cottage	"	12
Mrs. F. Glazier	The Vista	Littleton	15
F. E. Derkshire	Howard	Bethlehem	
G. L. Gilmore	Broad View	"	
J. K. Barrett	Strawberry Hill House	"	
C. L. Bartlett	Mt. Washington House	"	70
H. E. Smith	Echo Cottage	"	
B. Tucker	Park Cottage	"	
G. W. Smith	East View House	"	
E. R. Thompson	Prospect Cottage	"	26
Mrs. Padelford	Idlewild Cottage	"	
F. L. White	Plummer Cottage	"	
A. Spring	Greenfield House	"	
BOSCAWEN.			
Hanibal Bonney	Penacook House	Penacook	30
Henry Coffin	Chestnut Farm	Boscawen	
C. W. Keniston	Hillside Farm	"	25
Henry Ferrin	Hillside Farm	"	6
Samuel Choat		"	
Jacob Hosmer		"	
BOW.			
George W. Colby		Bow Centre	
J. S. Austin	Chatagee	North Bow	10
BRADFORD.			
George A. Smith	Bradford House	Bradford	
Charles Gillis	Gillis	"	60
Henry McCoy	Bradford Springs	East Washington	150
Addison S. Cressey	Meadow Brook Farm	Bradford	25
Greeley M. Cressey	Sunny Side	"	20
Anson S. Dill		"	
Sarah P. Morse		"	20
George B. Andrews	Hillside Farm	"	20
L. B. Butman	Butman House		20
H. C. Felch	Hill Rest	"	10
Mrs. C. E. Hadley		"	10
F. H. Patch		"	10
Albert Larkin		"	
BRENTWOOD.			
John A. Rowell		Exeter	15
Addison B. Rowell		"	25
Peter Davis		Brentwood	10
E. G. Brackett		"	12
Miss Emma Sinclair		"	
Mrs. E. E. Thompson	Thompson Farm	"	6
BRIDGEWATER.			
William A. Sawyer	Lake View	Bridgewater	75
D. Y. Fifield	Bay View	"	50
Mrs. Orrin L. Dolloff	Elm Lawn	"	25
G. B. Dolloff		"	14
Hiram S. Tilton		"	

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
BRISTOL.			
M. F. Wilber	Bristol House	Bristol	100
E. T. Pike	Maple Cottage	"	12
S. S. Brown	Newfound Lake Farm	"	25
J. H. Ackerman	Pine Grove Farm	"	12
Mrs. R. S. Young	Florence Cottage	"	10
BROOKFIELD.			
Henry W. Peavey	Moose Mountain Cottage	Wolfeboro' Junction.	
John W. Prescott		Union	
Jonathan W. Sanborn	Pine Grove Farm	Wolfeboro' Junction.	
BROOKLINE.			
C. L. Forbes	Brookline House	Brookline	
Mrs. L. P. Peabody	Elmwood House	"	
N. W. Colburn		"	8
James S. Cox		"	
CAMPTON.			
J. C. Blair	Blair Hotel	Blair	65
E. H. Sanborn	Sanborn House	West Campton	130
C. H. Sprague	Sunset Hill House	Campton Village	50
Sawyer & Marvell	Hillside	" "	45
C. H. Damon	Highland House	" "	
A. B. Cook	Maplewood House	"	20
C. G. Avery	Maples	Campton	25
G. S. Bartlett	Three Elms	"	20
F. P. Hart	Willey House	Campton Village	10
T. S. Pulsifer	Cottage Farm	Plymouth	10
S. S. Mitchell	Bald Hill House	"	10
S. F. Hill	Hills Cottage	"	16
D. B. Pulsifer		"	8
CANAAN.			
Sawyer & Trull	Jerusalem Springs House	Canaan	50
Mrs. David Whittier	Pinnacle House	Canaan Street	50
Henry Martin	Twin Cottages	" "	30
H. B. Tenney	Sunset House	" "	25
A. D. Howe		" "	
H. W. Miller		" "	
Mrs. Gilbert Spencer	Prospect Farm	" "	20
CANDIA.			
Thomas B. Turner		Candia	
Jesse M. Sargant		"	
Mrs. G. Lang		"	
Mrs. Gilchrist		"	
William Patten		"	
F. D. Rowe	Rockdale Cottage	"	10
Frank W. Eaton	Highland View	"	25
CANTERBURY.			
George Fletcher	Hancock House	Canterbury	30
O. W. Dow	Pippo House	East Canterbury	12
George Gale	The Maples	Canterbury	25
John H. Batchelder		"	6
A. B. Lovering	Lovering	"	20
Edwin B. Peverly	Peverly Farm	"	20
Leone J. Chase	Osgood House	"	25
Jonathan C. Greenough	Picturesque Retreat	"	15
Myron C. Foster	Hillside Farm	"	10
Joseph R. Hancock	Canterbury House	Upland	50
J. P. Dearborn	Elm Cottage	Canterbury	

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PENACOOK LAKE.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
CARROLL.			
Barron & Merrill	Crawford Hotel	Crawford Hotel	450
F. A. Cofran	Twin Mountain Hotel	Twin Mt. Hotel	300
Barron & Merrill	Fabyan Hotel	Fabyan's	250
Barron & Merrill	Mount Pleasant Hotel	Mt. Pleasant Hotel	400
S. W. Kelley	Mount Martha	Twin Mt. House	25
Charles S. Miles	Pleasant View	" "	20
Dora Chase	Chase Cottage	" "	20
R. D. Rousevel	White Mountain House		150
Barron & Merrill	Summit House	Mount Washington	250
H. E. Jenness	Elmwood Hall	Twin Mts.	25
CENTRE HARBOR.			
J. L. Huntress & Son	Senter House	Centre Harbor	150
S. F. Emery	Moulton House	" "	75
Benjamin F. Kelsea	Locust Cottage	" "	25
David W. Cram	Grampian House	Meredith	30
Mrs. Rhoda A. Benson	Elm House	Centre Harbor	30
David M. Whitcher		" "	
Dr. William A. Page		" "	25
A. W. Canney	Grand View Cottage	Meredith	12
Henry C. Sturtevant	Sturtevant Farm	Centre Harbor	12
Stephen Wentworth	Willow Cottage	" "	
Mrs. B. F. Wentworth	Brown Cottage	" "	12
George Sturtevant	Elm House	" "	25
J. B. Greene	Sunny Side Cottage	Moultonborough	8
Mrs. F. F. Greene	Red Hill Cottage	Centre Harbor	20
Mrs. Alonzo Perkins	Pine Hill Cottage	Meredith	14
CHARLESTOWN.			
C. S. Symonds	Eagle Hotel	Charlestown	50
Mrs. T. S. Evans	Evans House	"	20
Horace Kimball	Elm House	"	
Mrs. F. W. Harris	Harris House	"	14
Mrs. A. C May	Maplewood	"	8
CHATHAM.			
Charles S. Chandler	Chandler's Cottage	North Chatham	12
Dana Hill		South Chatham	10
D. O. Pickering		" "	
Thomas Smith		" "	4
CHESTER.			
Samuel L. Marston	Emerson Hotel	Chester	
Albert J. Merrill	Merrill House	East Chester	40
Mrs. Henry A. Hall		" "	20
Addison A. Bean		Chester	20
Horace E. True	Riverside Farm	Raymond	14
Frank E. Leighton	Highland House	Chester	30
George Hook		"	12
John A. Hezelton		East Chester	
Mrs. Edward Hezelton		" "	
Barnard P. Robie		Chester	
George N. West	Willowdale Cottage	"	10
Willis S. Merrill	Orchard Farm	"	10
Henry Moore		"	6
CHESTERFIELD.			
A. R. Mason	Prospect House	Keene	100
J. H. Goodrich, 2d	Lake View	Chesterfield	50
Dunton & Faro	Lakeside	Brattleborough, Vt.	75
Luther Plumer	Woodside	" "	
Mrs. L. F. Bonney		Chesterfield	

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
CHICHESTER.			
Elijah B. Young		Chichester Centre	8
S. Ambrose Brown		Pittsfield	
Ira Sanborn		Chichester Centre	
CLAREMONT.			
Underhill & Bean	Belmont Hotel	Claremont	50
H. C. Fitch & Son	Sullivan House	"	70
C. M. Leete		"	
Lyman Fitch		"	10
G. A. Andrews		"	20
J. W. Chapin	Hillside Farm	"	10
R. B. Tull		"	
A. R. Campbell		"	30
COLEBROOK.			
T. G. Rowan	Monadnock	Colebrook	100
Daniel Rowan		"	40
S. B. Whittemore		"	
W. H. Milliken		"	
Addie Lyman		"	
Davis Graham	Mountain View	"	16
Addison Corbitt	Maple Cottage	"	14
Mrs. W. T. Phillips	The Elms		12
CONWAY.			
Recker & Hartshorn	Kearsarge Hotel	North Conway	250
Russell Brothers	Russell House	Kearsarge	135
S. Mudgett & Sons	Intervale	Intervale	300
M. L. Mason	Sunset Pavilion	North Conway	150
Dow & Hill	Ridge	Kearsarge	100
Alfred Eastman	Eastman	North Conway	90
L. J. Ricker	North Conway House	" "	75
L. L. Blood & Son	Conway House	Conway	100
Augustus Eastman	Arlest Falls	"	
L. Wheeler & Son	Orient	Kearsarge	40
F. L. Plummer	McMellan	Conway	100
J. T. Randall	Randall	"	75
T. C. Eastman	Moat Mountain	North Conway	30
Mrs. L. A. B. Jaffrey	Jaffrey	" "	40
G. F. Wolcott	Edgewood Cottage	" "	20
Dinsmore Brothers	Idlewild	Intervale	50
Mrs. S. D. Pendexter	Pendexter House	"	
David Wakefield	Dundee Mountain	Conway Centre	25
G. A. Heath	Heath Cottage	Conway	15
O. W. Merrill	Merrill House	"	20
J. D. Stott		Conway Centre	
J. F. Stott	Atherton Farm	" "	25
J. P. Palmer		Conway	
J. A. Barnes & Sons	Bellevue	Intervale	75
G. W. Marden	Pine Grove	Conway	20
R. D. Litchfield	Center Villa	"	
D. F. Pendexter	Pequawket Hotel	"	
L. D. Mills		Conway Centre	
E. R. Perkins	Perkins Farm	" "	12
David Putnam	Putnam Cottage	" "	10
C. H. Leavitt	Birch Hill Castle	Snowville	8
CORNISH.			
A. L. Peters	Valley House	Windsor, Vt.	
George F. Watts	Hampshire	Cornish Flat	20
J. W. Pierce	Fairview	South Cornish	20
Alfred Fitch	Dingleton	Windsor, Vt.	8
Albert Weld	Maple Cottage	Cornish Flat	6

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SILVER LAKE. — HARRISVILLE.

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
CORNISH. — *Continued.*			
S. A. Tracy	.....	Plainfield	.....
W. B. Quimby	Maplewood Farm	Cornish Flat	10
J. W. Fitch	.....	" "	6
F. L. Johnson	.....	Windsor, Vt.	.....
Charles H. Deming	Sunnyside	Cornish Flat	6
CROYDON.			
David A. Sargent	Croydon House	Croydon	20
Isaac P. Rawson	.....	"	.....
John Harding	.....	"	.....
DALTON.			
William B. Aldrich	River View House	Dalton	15
DANBURY.			
G. B. Pulsifer	Pulsifer House	Danbury	12
G. H. Wiggin	.....	"	12
J. A. Jackson	Jackson House	"	15
G. H. Jackson	Woodbine Cottage	"	20
Mrs. J. O. Gale	Danbury House	"	20
A. J. Danforth	.....	"	15
E. B. Nichols	Long Look Farm	"	30
J. D. Danforth	.....	"	.....
Fred Huntoon	Farland Vale House	"	10
Mrs. S. D. Tuck	Homestead Farm	.....	20
DEERFIELD.			
H. B. Stearns	.....	South Deerfield	10
G. Page	Exchange Hotel	Deerfield	.....
Walter Scott	Pleasant Pond	Epsom	12
J. D. Cate	.....	Deerfield	15
Annie M. Chase	.....	Deerfield Centre	.....
DEERING.			
A. L. Danielson	Bellevue Hotel	Deering	35
Levi W. Goodale	Orchard House	"	25
Esther P. Crosby	Highland House	"	16
William Forsaith	.....	Deering Centre	10
Dennis R. Chase	Maplewood House	East Deering	20
William H. Gilmore	Riverside	"	16
Mrs. Jesse Gregg	Lake View House	Deering Centre	10
R. E. Otis	.....	Hillsboro' Bridge	.....
DERRY.			
A. T. Willey	Bradford Hotel	Derry Depot	.....
Albert Newell	Hildreth Hall	Derry	40
William O. Noyes	Noyes Farm	"	20
Miner G. Frye	Frye House	Derry Depot	.....
George A. Webster	Grand View	" "	12
Joshua B. Morse	Pawtucket Farm	Derry	.....
M. Cullen	Maplewood Farm	East Derry	10
Walter D. Stevens	Stevens Farm	" "	.....
George W. Batchelder	Batchelder Farm	" "	25
Albert A. Davis	Davis Farm	East Windham	.....
Mrs. William Merrifield	Buttonwood Farm	East Derry	6
Mrs. William Reynolds	.....	"	.....
H. J. Bagley	Lakeside	Derry Depot	.....
Joseph Frost	Frost Mansion	Windham Depot	.....
James M. Batchelder	Valley House	East Derry	10
Mrs. John Burbank	Thomas House	" "	.....
DORCHESTER.			
William Buck	Daisy Farm	East Canaan	12

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
DUBLIN.			
H. R. Leffingwell	Appleton House	Dublin	75
Miss B. Esty	Parkhurst	"	
DUMMER.			
J. H. Chandler		Dummer	
Blanchard & Twitchell		"	
DUNBARTON.			
Daniel Jameson	Maple House	Dunbarton	30
Henry P. Kelley	Centre View	"	10
N. T. Safford		"	
E. P. Marshall		"	
DURHAM.			
J. M. R. Adams	Adams House	Newmarket	20
N. A. Pendergast		"	6
N. G. Wiggin	Oak Grove	"	12
J. G. Hutchinson		"	
Mrs. Martha D. Young	Young Farm	"	10
D. T. Woodman		"	
John H. Scott		"	
EAST KINGSTON.			
Ernest G. Currier		East Kingston	26
EATON.			
N. G. Palmer	Palmer House	Eaton Centre	32
J. N. Robertson	Robertson House	" "	20
Stephen Littlefield		Snowville	12
H. H. Robertson	Rock Mountain	Eaton Centre	25
William N. Snow		Snowville	
F. M. Hatch		"	8
C. H. Leavitt		"	
Mrs. E. A. Stanley	Riverside House	"	8
EFFINGHAM.			
John C. Leavitt	Green Mountain House	Effingham	
James H. Smith			
Shepard F. Demeritt		Effingham Falls	
Sylvester T. Lougee		" "	
Joseph B. Davis		" "	
Mary E. Marston		" "	
Almon Cross		" "	
Charles B. Savage		South Effingham	
Charles H. Stevens		"	
Samuel Clough	Glenwood House	" "	18
John A. Leavitt		Centre Effingham	
James F. Cate	Locusty Cottage	" "	6
Willard L. Meloon		Ossipee	
ENFIELD.			
George L. Hart		Enfield	
Lorenzo Day	Day Dawn	"	40
William A. Saunders	Lake View	"	30
John Morse	Mont Calm	"	40
T. B. Morgan	Maple Grove	"	12
William W. French	Maple Cottage	"	12
James Jackman	Elm Cottage	Enfield Centre	20
A. P. Howe	Mountain View	Lebanon	15
C. H. Webster	Webster House	Enfield	30
F. B. Morse	Codman House	Enfield Centre	40
E. R. Dustin	Sunrise House	" "	12

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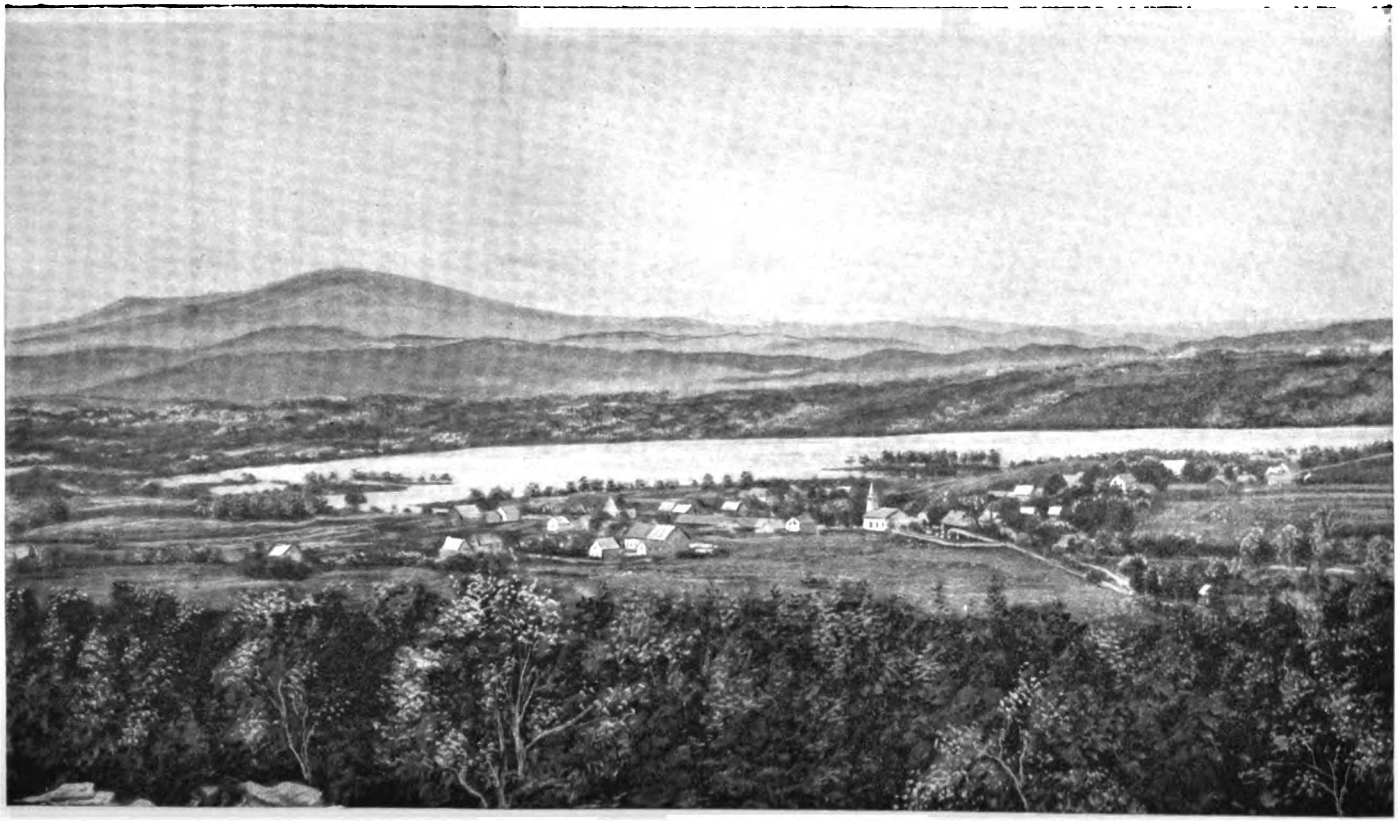

HIGHLAND LAKE. — ANDOVER.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
EPPING.			
Moses A. Perkins	Prospect House	Epping	30
L. D. Manville	Pawtuckaway	"	
G. O. Reynolds		"	6
Mrs. Ladd		"	
Mary Plummer		"	
ERROL.			
W. A. Bragg	Umbagog	Errol	50
John Akers	Akers House	"	15
L. H. Grover	Grover House	"	
G. C. Demeritt	Demeritt House	"	
J. W. Akers	Pond Cottage	"	15
FARMINGTON.			
E. T. Cotton	Wilson House	Farmington	50
William Welch	Central House	"	
Frank McAlpine	Strafford House	"	30
Park J. Connelly	Connelly Farm	"	25
John S. Roberts	Cloverdale Farm	"	30
FRANCESTOWN.			
A. H. Spalding	Francestown Hotel	Francestown	30
F. A. Prescott	Mountain Farm	"	20
N. H. Woods		"	
Mrs. P. L. Clarke		"	12
FRANKLIN.			
Mrs. O. B. Davis	Webster House	Franklin	
A. K. Moore	Franklin House	"	15
James Morse	Morse Cottage	"	8
Hiram Colby			
P. L. Kennedy		Franklin Falls	
Robert Young		" "	
Nathaniel Colby		" "	
Miss Minnie Cram		Franklin	
Albert M. Osgood		Franklin Falls	
FITZWILLIAM.			
O. K. Wheelock	Cheshire House	Fitzwilliam	150
O. K. Wheelock	Fitzwilliam Hotel	"	150
N. W. Cahill		"	
FRANCONIA.			
Taft & Greenleaf	Profile House	Profile House	500
Priest & Dudley	Forest Hill House	Franconia	150
Richardson Brothers	Mount Lafayette	"	75
M. B. Wheelock	Hawthorne	"	60
Alvin Granis	Mount Jackson	"	30
John M. Bickford	Maple Farm	"	12
W. H. Weisman	White Mountain Studio	"	
James Quimby		"	20
Henry Spooner		"	25
Mrs. Noah Wells	Grand View Cottage	"	14
Daniel Whitney		"	20
Edwin Nelson	Brooks Farm	"	25
Mrs. H. Knight	Mountain View	"	30
FREMONT.			
Warren True	True House	Fremont	
Andrew Brown		"	
Joseph B. Sanborn		"	10

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
FREEDOM.			
William Furbush	Loon Lake	Freedom	16
Mrs. R. Towle		"	
S. W. Fowler	Wayside Farm	"	20
Mrs. Marcia Danforth		"	
Fred Huntress	Prospect House	"	10
C. P. Danforth		"	
Mrs. Joseph Towle		"	
Hittie Andrews		"	
Mrs. C. P. Harmon		"	
Frank Tyler	Elm Farm	"	10
O. E. Drake		"	
GILMANTON.			
John L. Stoddard	Mountain View	Gilmanton	
A. R. Wight		"	30
R. A. Knowles		"	20
Mrs. Eunice Holbrook		"	
L. H. Mudgett		"	10
J. H. Drew	Mount Oakland House	"	10
Mrs. Emma Demett		"	
Stephen W. Sargent	Hill Rest	Gilmanton Iron W'ks	20
E. A. Paige	Crystal Lake	" "	20
Mrs. Charles A. Hatch	Rock View House	Gilmanton	18
Lafayette Canney	Hillside Farm	"	15
Charles W. Munsey		"	
Mrs. Mary A. Nutter		"	
GILFORD.			
Hunt Bros.	Winnette	Lakeport	25
J. H. Davis	Lily Pond	"	25
L. M. James		Laconia	15
E. M. Brown	Pleasant Valley	Lakeport	10
Ellen E. S. Wadleigh		Weirs	15
F. G. Smith	Prospect House	Laconia	10
Henri Blaisdell	Lake Shore Park Inn	Lakeport	
Palmer W. Merrill		"	
A. O. Sanborn		"	
GOFFSTOWN.			
S. D. Johnson	Shirley Hill House	West Manchester	70
H. S. Scribner	Scribner House	Goffstown Centre	
George Brothers	Yacum	" "	60
Mr. White	Central House	Goffstown	
H. L. Kimball	Maplewood House	Manchester	25
Daniel Shirley	Shirley Hill Farm	West Manchester	15
Daniel Davis		Goffstown	
Horace Richards		"	
GORHAM.			
G. D Stratton	Alpine	Gorham	
L. L. Jackman	Eagle Hotel	"	40
Mrs. F. H. Evans	Willis Cottage	"	35
Mrs. E. C. Spafford	Riverside	"	
Ann Lary	Lary House	"	
GOSHEN.			
Mrs. G. H. Brown		Mill Village	
H. S. George		" "	
Edwin Pettis		" "	
George Davis		" "	
Elmer Jacops		" "	
Joel S. Maxfield		Goshen	6

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SPOFFORD LAKE. — CHESTERFIELD.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
GREENFIELD.			
John D. Emmon		Greenfield	
GREENLAND.			
Dudley C. Littlefield	Mansion House	So. Newmarket Jc.	14
Phillip B. Holmes		Greenland	
GREENVILLE.			
W. A. Robinson	Columbian	Greenville	40
E. B. Barrett	Barrett House	"	12
HAMPSTEAD.			
A. P. Emerson	Hawthorn Lodge	Hampstead	2
Hannah B. Griffin		"	
W. H. Cobb	Mapleton House	"	8
Amasa Hunt	Maple Cottage	"	12
Frank Bigelow		"	12
John W. Marble	Valley Farm	"	20
HAMPTON.			
S. H. Dumas	Boar's Head	Hampton	200
S. H. Dumas	Rockingham House	"	60
Leavitt Brothers	Hampton Beach House	"	
Otis H. Whittier	Union House	"	75
John G. Cutler	Sea View	"	50
Curtis D. DeLancey	De Lancey House	"	
Lewis P. Nudd	Eagle House	"	60
Joseph J. Mace		"	25
Josiah C. Palmer		"	
Thomas L. Perkins		"	12
Elias S. Perkins		"	10
Oliver Nudd		"	
Mrs. Simon Leavitt	Elm Cottage	"	25
Austin Weare	Lancey	Seabrook	
Frank Beckman	Beckman House	Hampton	
Mrs. J. J. Leavitt		"	
Jacob B. Leavitt		"	
Frank Nudd	Nudd House	"	40
HAMPTON FALLS.			
John A. Brown		Hampton Falls	10
Mrs. J. A. Dow		"	8
Mary E. Elkins		" "	
HANCOCK.			
A. S. Wood		Hancock	
Helen Fowle		"	
J. F. Eaton	Hancock House	"	40
John Welch		"	
A. B. Stone	Maple Dale Farm	"	20
A. G. Foster		"	
Lydia Osgood		"	10
John Lindsay	Lindsey Farm	"	20
HANOVER.			
Dartmouth College	Wheelock House	Hanover	150
George W. Kibling	Dartmouth House	"	100
HARRISVILLE.			
James A. Mason	Grand View	Chesham	15
L. L. Howe		"	
M. M. Mason		"	12
Aaron Willard		"	
Solon Willard		"	

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
HART'S LOCATION.			
L. F. Atwood	Willey House	Crawford House	60
HEBRON.			
E. Barnard	Lakeside	East Hebron	24
John W. Sanborn	Grove Hill Farm	" "	25
Fred Clement	Union House	Hebron	
Cyrus Moore	Central House	"	
Geo. S. Smith	Hillside Farm	East Hebron	25
Hiram M. Worthley	Prospect House	Bridgewater	15
John E. Hartford	Maplewood Farm	East Hebron	12
HENNIKER.			
G. W. Miller	Hotel Henniker	Henniker	30
Charles Ray	Lake View Farm	"	12
J. B. Brown	Pleasant Lake Farm	"	16
Henry F. Huntington	Mountain View	"	12
D. W. Cogswell		"	12
J. A. Newton		"	
Warren Felch		"	
Mrs. C. R. Bacon	Fir Tree Cottage	"	8
Fred N. Webster		"	
W. D. Davis	Davis House	"	40
J. W. Emery		"	15
F. T. Huntington	Maplewood	"	6
Frank E. Colby	Oak Cottage	"	8
C. C. French		"	
George A. Gordon		"	
C. H. Courser		"	
A. J. Parker	Parker	"	10
Wesley Felch		"	
J. G. Rice		"	12
George H. Savage		"	
HILL.			
V. S. Straw	Glendale	Hill	30
L. T. Dearborn		"	10
H. L. Brown		"	12
D. B. Dickerson		Danbury	10
F. W. Foster	Riverside Farm	"	8
C. M. Cilley		Hill	
J. E. Newton		"	
George H. Cilley	Long Hill Farm	"	12
C. A. Blake		"	
W. H. Morrill		"	
HILLSBOROUGH.			
Peter H. Rumrill	St. Peter	Hillsboro' Bridge	25
William E. Gay	Maplewood Farm	" "	20
William Whittle	Maplewood	" "	10
Danforth & Gammett	Hillside Cottage	Hillsboro' Centre	8
James M. Wilkins	Grove Cottage	" "	10
J. B. Whittemore	Valley Hotel	Hillsboro' Bridge	75
E. C. Hoyt & Sons	Lake View	Hillsboro' Centre	100
W. E. Proctor	Proctor House	Hillsboro' Bridge	
Susan Gay	Elm Cottage	Hillsboro' Centre	10
Frank D. Gay	Echo Cottage	" "	20
HINSDALE.			
Ferren & Holland	Ashuelot	Hinsdale	50
I. K. Barcom	Bellevue	"	
Mrs. Janett Barcom	Hillside Farm	"	16
Waldo Rowillard	Mountain-Side Farm	"	25
Wallace Holton	Terrace Hall	"	

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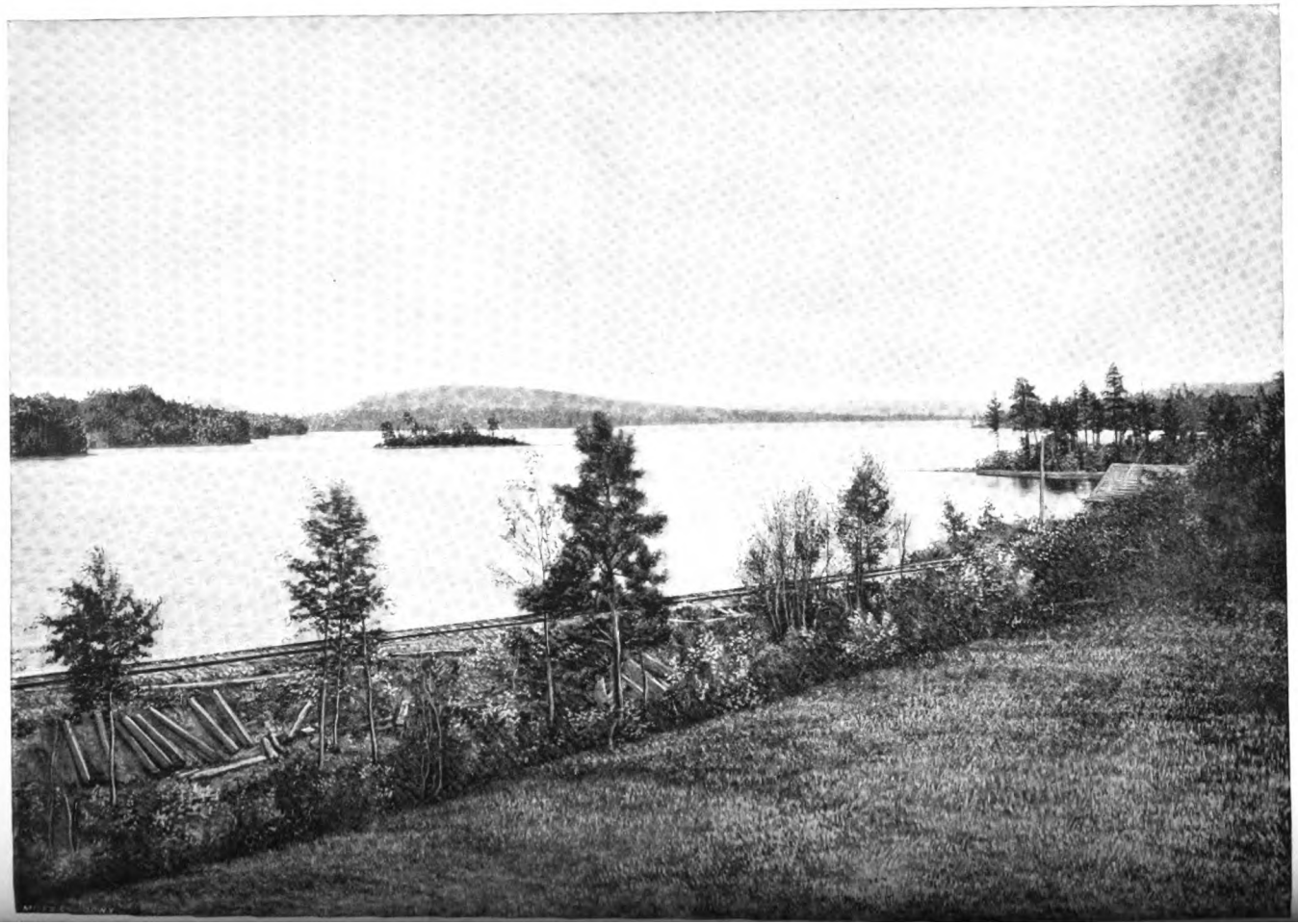

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
HOLDERNESS.			
Leon H. Cilley	Asquam	Holderness	130
Isaac Smith	Squam Mountain	"	30
C. L. True	Lake Farm	"	30
E. B. Balch	Camp Chocorua	"	.....
Winthrop Talbot	Camp Asquam	"	.....
R. B. Willoughby	Willoughby	"	.....
B. F. Jewell	Mount Livermore	"	100
H. S. Buzzell	White Oak	"	15
R. B. Piper	Innisville	"	.....
Newman Crowell	Cedar Cottage	"	14
Robert Curry	Lakeside Cottage	"	10
E. C. Bennett	Mount Morgan	"	35
Jason Sanborn		Plymouth	20
B. T. Mills	Seven Pines	"	50
S. J. Sleeper	Asquam View	Holderness	12
HOLLIS.			
S. M. Spaulding		Hollis	.....
Mrs. Warner Read		"	.....
William P. Cutter		"	.....
Maria Austin		"	.....
Edward P. Brooks		"	15
Levi Abbot		"	.....
John Stark		"	.....
Mrs. Mary A. Lovejoy	Silver Lake House	"	.....
Mrs. A. A. Paull		"	.....
Mrs. A. P. Gale		"	.....
HOOKSETT.			
Horace Bonney	Ayer House	Hooksett	.....
Horace H. Parker		"	.....
Mrs. Hannah Farmer		"	.....
Henry C. Carbee		"	.....
John I. Otterson	Otterson House	"	14
Rufus Fuller		"	.....
HOPKINTON.			
Frank A. Hale	Perkins Inn	Hopkinton	100
H. Sumner Chase	Highland Farm	Contoocook	50
W. L. Moulton	Pleasant View Farm	East Weare	20
George Symonds		Hopkinton	15
Reuben A. Gerry	Gerry House	Contoocook	20
William F. Dodge	Sargent House	Hopkinton	16
Guy Montgomery		"	.....
Lucy A. White		"	.....
HUDSON.			
S. A. Greeley		Hudson	.....
Mrs. Peter Poff		"	.....
Clifton M. Hills		"	.....
JACKSON.			
M. C. Wentworth	Wentworth Hall	Jackson	150
Trickey Brothers	Jackson Falls	"	40
W. A. Meserve	Iron Mountain	"	100
C. W. Gray	Gray's Inn	"	125
S. M. Thompson	Glen Ellis	"	125
C. E. Gale	Eagle Mountain	"	90
J. E. Meserve	Hawthorne	"	40
Frank Wilson	Wilson Cottage	"	35
I. H. Harriman	Spruce Cottage	"	12
J. M. Perkins	Carter's Notch	"	28
W. G. Gray	Gray's Inn	"	.....

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
JACKSON. — *Continued.*			
B. M. Fernald	Glendon Cottage	Jackson	22
C. B. Perkins	Perkins Cottage	"	
W. E. Elkins	Cliff Cottage	"	14
C. S. Meserve	Mapleton Cottage	"	11
Ephraim Garland	Dundee Cottage	Lower Bartlett	18
JAFFREY.			
J. B. Proctor	Proctor House	Jaffrey	25
Jonas Cutter	Cutter House	"	70
M. E. Cutter	Central House	"	
Benjamin Pierce	Granite State House	East Jaffrey	
J. H. Poole	The Ark	Jaffrey	40
E. P. & E. C. Shattuck	Shattuck House	"	50
Mrs. A. D. Pierce		"	20
F. J. Lawrence		"	12
Alfred Sawyer & Son	Maple Retreat	East Jaffrey	15
JEFFERSON.			
Plumer & Porter	Waumbek	Jefferson	250
E. E. Bedell	Jefferson Hill House	"	100
P. C. Plaisted	Plaisted House	"	
John W. Crawshaw	Mount Adams	Jefferson Highlands	55
E. A. Crawford & Son	Crawford House	" "	45
J. L. Pottle	Highland House	" "	50
G. W. Crawford & Son	Pliny Range	" "	45
T. M. Bradley	Grand View	Jefferson	40
Frank W. Collins	Maple House	"	
Plumer & Porter	Star King	"	
W. H. Crawford	Cold Spring	"	30
Hight Brothers	Union House	"	30
N. M. Davenport	Hillside House	"	23
John Palmer	Cloverdale	"	
Mrs. C. A. Woodward	Woodward Cottage	"	
KENSINGTON.			
Mrs. J. P. Lamprey	Pine Grove	Kensington	12
Mrs. S. C. Chase			10
W. N. Shaw	Orchard Hill	Exeter	6
Mrs. D. D. Prescott		"	
Clinton Gove		"	
KINGSTON.			
G. A. Varrell	Kingston House	Kingston	20
Mrs. S. N. Gray	Great Hill Cottage	Exeter	12
Mrs. E. M. Frost	Frost House	Kingston	
Henry Goodwin		"	10
O. H. Key		"	
John T. Hilliard		"	
Samuel W. Stevens		Exeter	6
R. Benson Bartlett		"	15
John A. Furber		"	
Charles Elkins	Birch Grove Farm	"	10
Mrs. F. M. Cummings	Maplewood Farm	"	20
LACONIA.			
G. W. Weeks	Lakeside House	The Weirs	150
C. E. Sleeper	Sanborn's House	" "	100
J. W. Williams	Winnecoette	" "	75
Dennett & Brown	Aquedoktan	" "	40
Mrs. S. C. Moore	Endicott House	" "	30
D. B. Story	Story's Hotel	" "	50
Mrs. G. H. Mitchell	Eagle Cottage	" "	20
John Spalding	Good Luck House	" "	20

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WINNISQUAM LAKE — LACONIA

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
LACONIA. — *Continued.*			
Mrs. E. L. True	Maple Cottage	The Weirs	25
Mrs. L. W. Lovett	Lovett Cottage	" "	15
Mrs. Moses Gordon		" "	15
Mrs. J. E. Avery		" "	20
Fred B. Smith	Eagle Hotel	Laconia	50
L. H. French	Wonolancet Hotel	"	60
L. H. Fernald	Kirtland House	"	40
Mrs. A. A. Weeks	Vue de l'eau	"	100
E. A. Chase	Round Bay Farm	"	16
Seth Flanders		"	10
LANCASTER.			
Rod Linsley & Son	Lancaster House	Lancaster	100
W. L. Rowell	Hillside Cottage	"	
Chester A. Ball	Williams House	"	
LANDAFF.			
J. E. Hall		Landaff	
O. D. Eastman		"	15
J. F. Gale		"	
Mrs. C. C. Temple		Lisbon	
LANGDON.			
George R. Holden	Elm Farm	Langdon	12
Henry M. Elwell		"	
LEBANON.			
Sidney Roberts	Chiron Spring	Lebanon	40
Osgood T. Purmont	Sunside House	"	
LEE.			
Howard M. Glidden		Lee	20
Mrs. Robert Dalton		"	10
Charles Allen		"	
LEMPSTER.			
A. R. Hood	Granite House	Lempster	18
Fred Barton	Lempster House	"	35
LINCOLN.			
Elliott Brothers	Flume House	Lincoln	
LISBON.			
E. H. Goodnow & J. W. Prackett, Jr.	Goodnow House	Franconia	225
Bowles & Hoskins	Sunset Hill House	Sugar Hill	300
H. Noyes & Son	Lookoff Hotel	"	200
W. B. Phillips	Phillips House	Franconia	75
Wells & Woolson	Breezy Hill House	Lisbon	160
Lyman Aldrich	Maple Cottage	Sugar Hill	25
George Aldrich	Grand View	"	
Nathan Whipple	Cedar Cottage	" "	
Leonard Smith	Hillside Farm	" "	20
Jason Comey	Echo Farm	Franconia	20
Edwin Knight	Hillside House	Lisbon	30
E. W. Bartlett	Elm House	"	25
Will Bishop	Bishop Farm	"	25
Ira Jesseman	Jesseman Farm	"	15
Foster Aldrich	Pearl Lake	"	25
Simon Bowles	Elm Farm	Sugar Hill	25
S. H. Brigham	Brigham House	Lisbon	50
Moses Northey	Northey House	"	20
Olivia Young	Sugar Hill	Sugar Hill	
Darius Jesseman	Jesseman Farm	" "	30

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
LITCHFIELD.			
Charles H. McQuestion	Island Farm	Reed's Ferry	
Thomas McQuestion	Highland Spring	Litchfield	
Robert McQuestion	Good Samaritan	Hudson	
Jacob Whittemore	Lilac Cottage	Litchfield	
LITTLETON.			
Farr & Jarvis	Oak Hill House	Littleton	150
A. W. Weeks	Cheswick Inn	"	100
E. O. & Gilman Wheeler	Wheeler Hill House	"	35
Aaron D. Fisher	Sunnyside	"	14
E. D. Sawyer	Mountain House	"	50
M. F. Young & Co.	The Maples	"	50
F. R. Glover	Elm Cottage	"	20
Noah Farr	Meadow Farm	"	16
William Harriman	Hill Cottage	"	15
George Abbott		"	12
LONDONDERRY.			
William G. Cross	Woodbine Cottage	Londonderry	10
Charles S. Pillsbury		"	8
John H. Burbank		"	20
B. F. Whorf	Highland View	"	10
C. B. Knowles		"	20
S. P. Robie	Lake View	"	12
John A. Moore		"	
G. F. McGregor		"	
R. Flanders		"	10
Thomas T. Moore	Locust Grove Farm	Derry Depot	12
LOUDON.			
J. J. A. Huchins		Loudon	
H. J. Osgood		"	12
Mrs. J. L. Perkins	Perkins House	"	16
John B. Perkins		"	20
David S. Clough		"	20
Mrs. D. W. Whittemore	Hillside House	"	
Josiah Leavitt	Sunset Lodge, Corn Hill	"	25
H. Alvin Beck	Wild View	"	20
Doddridge Wheeler		"	
Amos Currier	Forest Home	"	15
D. P. Wheeler	Hillside Farm	"	20
Davis S. Clough		"	
A. H. Clough		"	15
John M. Ladd		"	20
Charles E. Sanborn		"	
J. A. Clough		"	
Levi Pearl		"	
Amos Peaslee		"	
J. L. Buswell		"	20
J. P. Wheeler		"	
W. H. Sanborn		"	25
A. M. Osgood		"	
John R. Osbourne	Prospect House	"	15
LYMAN.			
Miner & De Huff	Highland Home	Lyman	10
H. & W. L. Chase		"	15
LYME.			
Kate G. Perkins	Union House	Lyme	10
George R. Amsden		"	
H. Chase		"	15
J. W. Minkler	Minkler Hotel	"	50

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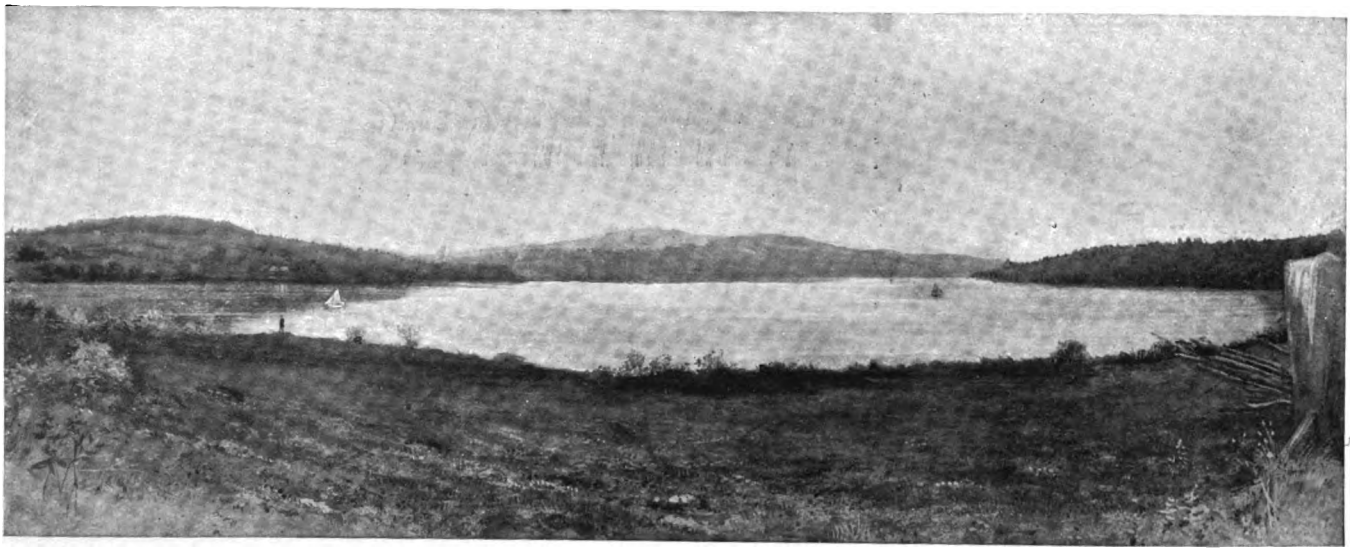

GRANITE LAKE. — NELSON.

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
LYME. — *Continued.*			
H. F. Carr		Lyme	6
H. H. Holt		"	6
LYNDEBOROUGH.			
Levi P. Hadley	Pine Grove	Lyndeborough	
E. P. Duncklee	Mountain Side	"	80
Dana B. Sargent		"	20
D. P. Hartshorn	Hillside Home	"	20
J. A. Woodward		"	15
Rodney Perham		East Wilton	
Mrs. Olive Watkins	Poplar House	North Lyndeborough	30
H. H. Joslin		" "	
Mrs. F. H. Curtis		East Wilton	13
Mrs. Mary Swazey		South Lyndeborough	
Charles Butler		" "	
MADISON.			
David Knowles	Lake View	Silver Lake	33
H. C. Colby	Jackson House	Madison	30
Mrs. Arvilla R. Forrest	Silver Lake House	Silver Lake	25
Robert H. Chick	Maple House	Madison	30
Nathaniel Churchill	Churchill House	"	16
MARLOW.			
George A. Petts	Forest House	Marlow	
MEREDITH.			
O. N. Roberts	Grove House	Meredith	
H. W. Lincoln	Prospect House	"	50
T. Gray	Elm House	"	40
W. H. Keysor	Mountain View	"	30
P. & E. A. Page	Bay View	"	20
D. L. Alexander	Maplewood House	"	12
M. C. Pease	Highland House	"	
A. J. Watson	Lake House	"	20
W. E. S. Foss	Waukawan	"	40
T. Ham		"	
J. Mudgett		"	10
W. B. Smith		North Sanbornton	20
N. B. Plumer	Granite Ledge Cottage	Meredith Centre	8
Alvah Smith		"	10
W. W. Ballard		" "	25
MERRIMACK.			
George F. Spalding		Merrimack	30
Frank Deering	Reeds Ferry House	Reeds Ferry	35
Mrs. D. S. Beard	Althea Cottage	" "	10
Mrs. Wingate M'Question		Merrimack	
E. P. Giddings		Thornton's Ferry	
MIDDLETON.			
Albert S. Baker	Hillside Farm	Wakefield	12
MILFORD.			
J. H. Plummer	Ponemah	Amherst Station	100
H. D. Epps	Endicott	Milford	30
E. P. Hutchinson	Broad View	Wilton	15
E. R. Cutts		Milford	
John Horton	Elm Farm	"	10
MILTON.			
Harriet Edgerly	Phenix	Milton	20
Horace Drew	Drew Hotel	"	80

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
MILTON. — *Continued.*			
Crosby H. Prescott	Hotel Prescott	Milton	
John E. Hayes		"	
Mrs. Abbie D. Butler		"	15
Samuel W. Wallingford		"	
Benjamin Hoyle	Centennial House	"	
Daniel Philbrick		Milton Mills	
John W. Hanson		" "	
MONT VERNON.			
G. E. Baker	Bellevue	Mont Vernon	60
M. J. Sherman	Mont Vernon Hotel	" "	250
Clark Campbell	Prospect House	" "	50
W. H. Conant	Conant Hall	" "	50
Miss Hattie Dean	Deanery	" "	30
Ira Hill	Hillsborough House	" "	40
W. S. A. Starrett	Home Cottage	" "	40
W. H. Marvell	Village Farm	" "	15
Mrs. J. A. Holt		" "	10
Mrs. S. C. Clement		" "	10
Henry T. Dodge	Sunnyside Farm	" "	15
Charles F. Stinson	Highland Farm	" "	25
Thomas Sargent	Cæsar Brook Farm	" "	16
Daniel H. Smith	Pine Grove Farm	" "	25
MOULTONBOROUGH.			
George K. Brown	Long Island Hotel	Long Island	40
A. M. Blake	Island Home	" "	50
J. C. Pitman	Elmwood	Moultonborough	15
Roland H. Green	Cambridge	"	
Mrs. Frank Green	Red Hill	"	
J. W. Day	Lake View	Lake View	15
James M. Smith	Moultonborough	Moultonborough	25
A. P. Jaclard	Union	"	25
Mrs. B. McDonald	Spring Home	"	20
Eben Moulton		"	
Mrs. Jennie Graves		Centre Harbor	
Charles Greene		" "	
Jim Moulton		" "	
Alvin Moulton		" "	
Mrs. George Gilman	Sunset Cottage	Melvin Village	16
Mrs. C. A. Moulton		Moultonborough	
Aaron Langdon		"	
Albert S. Freese		"	
Mrs. John Beane		Centre Harbor	
Daniel Goodwin	Bason Hill Farm	" "	15
NELSON.			
Orson Tolman	Eagle Lake Cottage	Nelson	12
Frank Hardy		"	
John Lane		"	
Frank P. Nelson		Munsonville	
Sidney A. Greene		"	
Mrs. Mark M. Bailey	Brookside	Nelson	10
Mrs. Calvin Fletcher		"	10
NEW BOSTON.			
S. L. Marden	Summit House	New Boston	75
Mrs. George Greenwood	Greenwood House	" "	25
C. A. Trow	Young's House	" "	
Mrs. S. D. Atwood	Prospect Cottage	" "	20
Richard Patten	Highland Farm	" "	30
James Warren	Maple Ridge	" "	22
Almus Warren	Wilson Hill	" "	55

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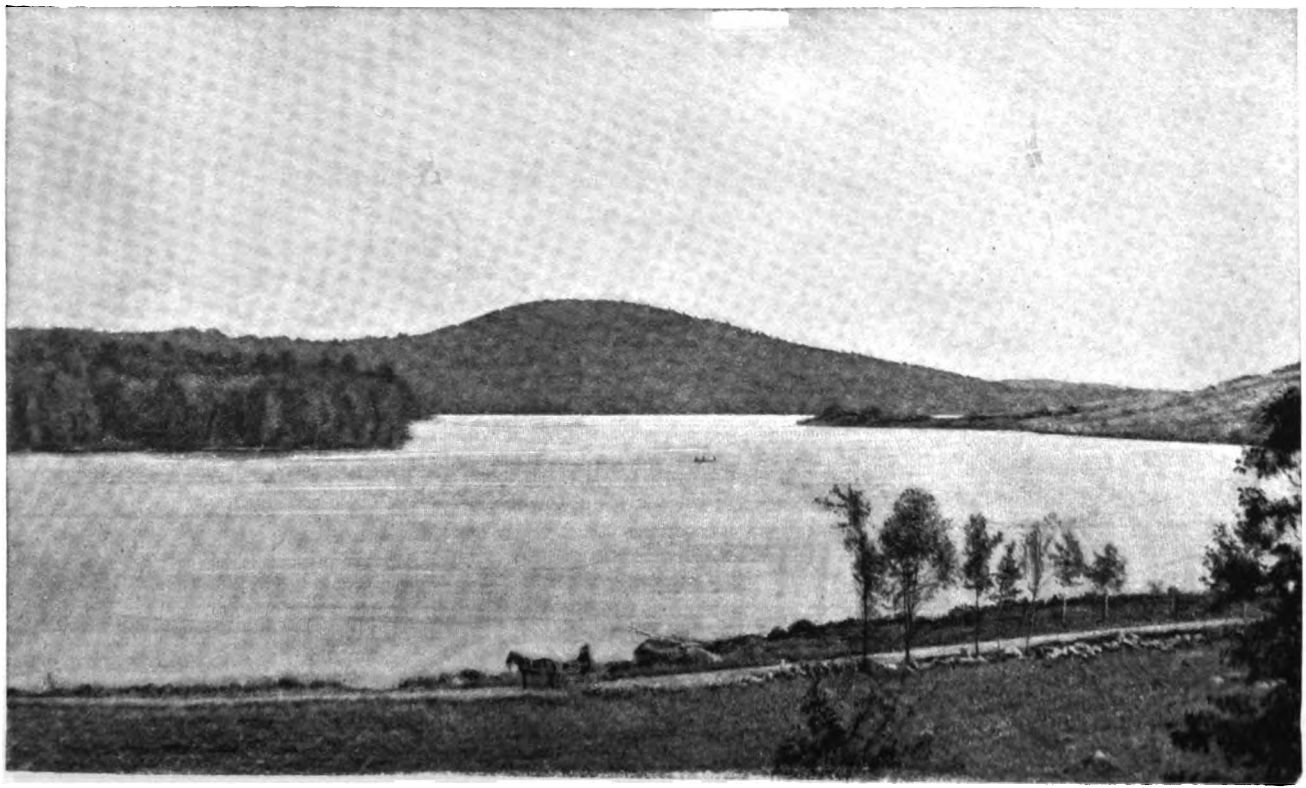

WINNEPOCKET LAKE. — WEBSTER.

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
NEW BOSTON. — *Cont'd.*			
John Kidder		New Boston	25
Mrs. S. T. Scofield		" "	
C. F. Dodge		" "	12
George A. Prince	Hillside Farm	" "	30
G. A. Hill		" "	
Mrs. Frank Read	Pleasant View Farm	" "	20
NEW CASTLE.			
Frank Jones	Wentworth	Portsmouth	500
Miss Louise White		Newcastle	14
Thomas Rand	Rand's Cottage	"	15
C. E. Campbell		"	
Mrs. Sarah Emerson		"	
Mrs. Addie Frost		"	
Thomas Haywood		"	
John Albe		"	
George A. Bartlett		Cambridge, Mass	
Miss Esther Albe		Newcastle	
Mrs. Adeline Yeaton	Cambridge Cottage	"	
Warren A. Osgood	Fort Cottage	Suncook	
Elias Tarlton		Newcastle	
NEWBURY.			
George W. Blodgett	Forest House	Newbury	200
Mrs. S. J. Clement	Lake	"	30
N. S. Johnson	Mountain House	Mt. Sunapee	
Mrs. Davis Shaw	Mountain View	South Newbury	12
Mrs. B. A. Dodge		Mt. Sunapee	
Mrs. Cerendo Gillingham	Twilight House	Newbury	
Mrs. Harry C. Morse	Maple Grove Farm	South Newbury	20
N. B. Bly	Fair Haven Farm	" "	10
Jonathan Rowe		Newbury	
NEW DURHAM.			
Charles Brooks		New Durham	20
Joseph P. Brooks		" "	10
NEW IPSWICH.			
H. A. Coleman	Appleton Arms	New Ipswich	50
C. L. Robbins		" "	
Fannie Barr		" "	
J. Silver, Jr	Clark's Hotel	" "	
George Porter		" "	
A. J. Jorden	Cold Spring Farm	" "	10
NEWINGTON.			
Mrs. J. W. Whidden		Newington	
Moses H. Whitman		"	
C. M. DeRochemont		"	
James W. Coleman		"	
Frederick Pickering		"	
NEWMARKET.			
Joseph B. Silver	Washington House	Newmarket	30
John Smith	Elm House	Newmarket Junction	
Nelly Morgan	Newmarket Hotel	Newmarket	20
Edward H. Clark		"	
Mrs. Jasper H. Burley		"	
Almon P. Smith	Garrison Cottage	"	14
Smith Sanborn		"	8
O. J. Drew	Bay View Farm	"	8

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
NEW LONDON.			
Burpee & Whipple	The Heildelburg	New London	125
H. J. Currier	The Elms	" "	25
D. S. Seamans	Seamans' House	" "	20
N. C. Todd	Maple Hill House	" "	25
J. C. Cross	Little Sunapee	" "	16
Baxter Gay	Glengae House	" "	50
G. M. Knight	Sunapee View	" "	40
G. P. Sholes	Mountain View	" "	20
E. F. Messer	Pleasant View	" "	20
A. J. Messer	Highland Home	" "	30
Hiram Sargent	Pleasant Lake Farm	" "	12
W. P. Messer	Lakeside Farm	" "	16
F. A. Messer	Maple Grove House	" "	16
Ai Worthen	Burpee Hill House	" "	10
G. S. Prescott	Lake Side	" "	50
B. C. Davis	Willows	" "	
J. K. Law	Willow Farm	" "	12
Natt Messer	Quiet Home	" "	10
Mrs. L. H. Fowler	Pine Tree Inn	" "	
Mrs. E. G. Smith	Elm Farm	" "	
David Hayes	Currier Home	" "	
E. P. Burpee		" "	
C. E. Shepard		" "	
Stephen Messer		" "	
Mrs. C. D. Sargent		" "	16
R. Farwell		" "	16
A. J. Sargent		" "	
W. S. Carter	Carter House	" "	10
N. L. Sargent	Sargent Cottage	" "	5
J. B. Roby			
Mrs. R. O. Messer		Scytheville	
Mrs. A. B. Whittier	Whittier House	"	20
NEWPORT.			
E. L. Putney	Newport House	Newport	
Henry Barker	Phenix	"	50
Samuel M. Rockwell	Pleasant View Farm	"	8
George H. Fairbanks		"	
Richard Thompson		"	12
Benjamin F. Carr		"	
Calvin Brown	Riverside House	"	50
Jonathan Daglish		"	
Mrs. Goodrich		"	
Solomon Moody	Maplewood Farm	"	12
Ira Harmon	Highland Cottage	No. Newport	20
Edward Fletcher		"	12
Frederick W. Aiken		Newport	
Charles E. Stubbs		"	
Sidney Stockwell		"	
Mrs. J. E. Reed		"	10
NEWTON.			
George W. Hoyt	Travelers' Home	Newton	47
Nathan Gould	Gould's Hill Farm	"	19
NORTHFIELD.			
Mrs. Walter Glines		Northfield	
C. W. Whicher	Maple Cottage	Tilton	20
Morrill Moore		Northfield	15
NORTH HAMPTON.			
Albert Bachelder	Little Boar's Head	Little Boar's Head	150
G. A. Boynton	Boynton	" "	25

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WALKER'S POND. — CONWAY.

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
NO. HAMPTON. — *Cont'd.*			
E. T. Brown		Little Boar's Head	
C. Prochold		North Hampton	
NORTHUMBERLAND.			
E. E. Tibbetts	Melcher House	Groveton	90
Merrian, Johnson & Co.	Eagle Hotel	"	50
T. S. Clark		"	
John Emes		"	
NORTHWOOD.			
Mrs. B. J. Demeritt	Demeritt House	Northwood	
Mrs. Sarah Caswell	Caswell House	Northwood Ridge	10
Mrs. S. S. Moore	Moore House	Northwood Centre	
S. W. Drake	Harvey	"	
J. M. Perry		Northwood	16
N. E. Cate		Northwood Ridge	
H. H. Hilliard		Northwood Narrows	
Francis J. Hanson		Northwood	
Mrs. G. Smith		"	
Enoch P. Flagg		"	20
NOTTINGHAM.			
Charles O. Smith		Northwood	12
Mary J. Demeritt		Nottingham	
Ira T. Daniels		North Nottingham	14
W. O. Hills		Nottingham	
Joseph P. Harvey		"	
Samuel Durgin		"	
Frank H. Butler		"	
ORANGE.			
D. L. Bryant	Mountain House	Canaan	30
ORFORD.			
A. D. Chamberlin	Elm House	Orford	
W. R. Barnes		"	
Everett Gage		"	
OSSIPEE.			
E. P. Allen	Carroll House	Ossipee	
J. W. Chamberlain	Central House	"	40
E. K. Knox		West Ossipee	
James Carney		Ossipee	
Daniel J. Sanders		Leighton's Corner	
J. E. Hodgdon	Hackmetack	Ossipee	20
Alva Hazzlett		"	
PELHAM.			
Charles Brown	Stickney Farm	Pelham	20
W. W. Butler	Butler Farm	"	20
Mrs. Claribel Butler	Gumpus Valley	"	20
Angie G. Kent	Forest Cottage	"	7
Orlando W. Spaulding		"	
PEMBROKE.			
John T. Merrill	Pembroke Cottage	Pembroke	18
David B. Richardson		"	
George P. Morgan		"	
Frank W. Stevens		East Pembroke	
PETERBOROUGH.			
F. B. Tucker	Tucker House	Peterborough	
A. O. Smith		"	

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
PETERBORO'.—*Cont'd.*			
C. W. Hunter	Silo Farm	Peterborough	8
Jerome B. Shedd		"	
J. O. Nay		"	10
Mrs. Mary A. Farnum		"	12
William Moore		"	12
J. E. Ellsworth		"	
Walter Haywood		"	
Philip Turner	Rock Farm	"	12
John Lynch		"	
Mrs. William Burt		"	
Marshall Nay		"	10
PLAISTOW.			
James M. Davis		Plaistow	
Isaac H. Pollard		"	
Sumner Courser		"	10
N. H. Wentworth	Kimball Farm	Atkinson Depot	
PLYMOUTH.			
C. M. Morse	Pemigewasset	Plymouth	250
Kate Jones		Piermont	
J. K. Hasford		"	
PITTSBURG.			
Henry Fling	Lake House	Pittsburg	
Thomas Chester	Camp Chester	"	20
Ed. Blais		"	30
PITTSFIELD.			
Josiah S. James	Mountain View	Pittsburg	35
F. E. Sanborn	Grand View	"	
D. O. True	Highland Farm	"	10
Mrs. S. P. Bunker	Park House	"	25
S. A. Brown	Maple Hill Farm	"	
H. Porter Smith		"	
P. S. Elliott		"	
F. W. Blake		"	10
RANDOLPH.			
R. I. Leighton	Randolph Hill	Gorham	75
L. M. Watson	Ravine House	"	60
Benjamin Kelsey	Kelsey House	"	18
George Wood	Riverville Farm	Randolph	10
G. C. Bradley	Bradley's Cottage	"	12
RAYMOND.			
George W. Shepard	Shepard House	Raymond	25
F. G. Bean	Eagle Hotel	"	25
P. B. Corson	Corson House	"	25
T. F. & Hiram McClure	McClure House	"	23
Frank R. Grant	Lamprey House	"	20
John Eaton	Walnut Hill House	"	25
Joseph Richardson	Richardson House	"	10
M. V. B. Gile	Giles Cottage	"	12
H. W. Batchelder	Batchelder House	"	25
R. G. L. Tilton	Tilton	"	
W. M. Leighton	The Wayside Farm	"	15
Ryland J. Mack	Raymond Cottage	"	14
J. W. Harriman		"	
RICHMOND.			
O. O. Whipple		Richmond	
L. A. Ballou	Red-top Farm	"	10

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LAKE PLEASANT. — NEW LONDON

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
RICHMOND.—*Cont'd.*			
Lemon Martin		North Richmond	
RINDGE.			
Frank N. Wheeler	Rindge Hotel	Rindge	
Silas E. Wood		East Rindge	
W. E. Stearns	Todd Hill House	Rindge	20
Mrs. L. L. Lawrence		"	12
D. H. Sargent		"	20
Frank D. Converse		West Rindge	
Harmon F. Prescott		" "	
Miss Susie Parsons		Rindge	
Gilman P. Wellington		"	
Henry W. Wellington		"	
C. R. Robinson		East Rindge	
Chester O. Hale		Rindge	30
ROLLINSFORD.			
Lewis Carey	Salmon Falls House	Rollinsford	
RUMNEY.			
Charles Spalding	Welcome House	Rumney Depot	20
H. C. Lufkin	Valley Farm House	West Plymouth	16
R. B. Clark	Daisy Cottage	Quincy	16
C. E. Bunker	Central House	Rumney	30
S. Adams & Son	Elm Avenue House	West Rumney	30
T. G. Stevens		Rumney	
C. C. Smart		Rumney Depot	
RYE.			
Henry Knox	Ocean Wave House	Rye Centre	150
J. C. Philbrick & Son	Farragut & Atlantic	Rye Beach	300
G. G. Lougee	Sea View	" "	200
R. P. Philbrick	Rising Sun Cottage	" "	50
S. B. Spear	Woodbine	" "	25
D. W. Dalton	Centennial House	" "	
A. J. Drake	Drake Cottage	" "	
J. W. F. Hobbs	Hobbs Cottage	" "	15
C. O. Philbrick	Elm Cottage	" "	
W. S. Philbrick	Urada	" "	
Mrs. E. C. Huse	Straw Cottage	Rye	70
T. L. Marden	Marden House	Rye Beach	50
Horace Sawyer	Sawyer House	" "	65
R. L. Locke		" "	
C. A. Jenness	Elmwood House	" "	35
David Jenness		" "	
N. G. Jenness		" "	25
Sheridan Jenness		" "	
O. S. Jenness	Jenness House	" "	26
Amos P. Brown	Brown's Cottage	Rye	20
George W. Brown		"	
Horace F. Rand		Portsmouth	
S. W. Foss		"	
SALEM.			
George Woodbury	Woodbury House	Salem	12
Isaac Campbell	Walnut Hill Farm	North Salem	38
Charles Webster		Salem	5
George A. Lincoln		North Salem	
SALISBURY.			
Dr. J. J. Dearborn	Summer House	Salisbury	20
M. A. Sawyer		"	
J. C. Smith		"	

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
SALISBURY.—*Continued.*			
D. C. Stevens		Salisbury	30
E. C. Currier	Maple Grove	West Salisbury	8
C. Greene		Salisbury	
Mrs. John Corson		"	
F. P. Drew	Elm House	Salisbury Centre	12
Nicholas Wallace		Salisbury	
F. W. Prince	Riverside Farm	West Salisbury	18
A. L. Chapman	Kearsarge Cottage	Salisbury	
D. J. Mann		Salisbury Centre	
J. T. Stevens		West Salisbury	
SANBORNTON.			
Charles O. Johnson	Lake Cottage	Laconia	30
Nathaniel Davis		"	
M. W. Bennett	Maplewood Farm	East Tilton	25
Hiram B. Philbrick		" "	
A. M. Osgood	Highland Farm	Franklin Falls	16
J. B. Calef		Sanbornton	
N. G. Yeaton	Mountain View	Tilton	12
Isaac B. Hoyt		North Sanbornton	
SANDWICH.			
Henry F. Dorr	Sandwich House	Centre Sandwich	30
J. C. Burleigh	Pleasant House	" "	12
A. S. A. Gilman		" "	10
H. E. Moulton		" "	10
D. W. George		" "	
Asahel Wallace	Bear Camp	" "	16
Samuel Chase		" "	12
John A. Marston		" "	20
S. D. Wiggin		" "	16
L. C. Ambrose	Mount Whiteface House	North Sandwich	20
William McCrillis	Glen Cottage	" "	20
Frank Bryer	Mount Israel House	Centre Sandwich	18
Jonathan Tappan		" "	30
Eleanor Gilman		" "	10
S. H. Burleigh	Willow Cottage	" "	20
Ruth Claffey		" "	15
H. H. Powers	Learsi Heights Cottage	" "	20
James E. Mudgett		" "	15
James B. Goodwin		" "	
SANDOWN.			
Enoch R. Quimby	Triple Elm	Sandown	15
John S. Colby	Elm View	"	24
Edwin C. Mills	Penne Royal	"	40
Charles A. Darbe	Darbe House	"	22
Allen Senter		"	20
David Tilton	Tilton House	"	20
SEABROOK.			
Lydia Parker	Parker House	Seabrook	
SHELBURNE.			
C. C. Hibbard	Winthrop House	Shelburne	40
S. J. Morse	Spring House	"	75
A. C. Evans	Evans Cottage	"	
A. E. Whitman	Maple Grove Cottage	"	10
S. A. Gates	Gates Cottage	"	35
A. E. Philbrick	Philbrick Farm	"	25
C. E. Philbrook	Grove Cottage	Gorham	

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WEBSTER LAKE. — FRANKLIN.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
SOUTH HAMPTON.			
Frank O. Towle		South Hampton	
David T. Woodman		" "	
Miss Clara E. Downing		" "	16
SOUTH NEWMARKET.			
L. H. Pinkham	Newfield House	South Newmarket	
SPRINGFIELD.			
S. P. Colby	Colby House	George's Mills	50
M. T. Chase	Star Lake House	" "	20
Talant Boyce		West Springfield	30
Enos Collins		Springfield	
C. F. Woodward	Springvale Cottage	"	16
STARK.			
William T. Pike		Stark	10
Benjamin A. Veasey		"	
STEWARTSTOWN.			
M. B. Noyes	Camp Diamond	Stewartstown	
STODDARD.			
S. J. Harrington	Central House	Stoddard	20
B. Griffiths		"	20
STRATHAM.			
David Jewell		Stratham	10
Charles A. Wiggin		Exeter	
George B. Wiggin		Stratham	4
Mrs. Sarah E. Taylor		"	
Dudley C. Littlefield		New Market Junction	
STRAFFORD.			
John M. Whitehouse	Blue Hill Cottage	Strafford Corner	
John M. Dow	Bow Lake House	" "	
Sarah J. Caverly		" "	
William W. Waleron		" "	
Gilbert Shaw		Centre Strafford	
A. P. Wentworth		Strafford	
SUNAPEE.			
Lake Sunapee Hotel Co.	Ben Mere	Sunapee	150
Francis M. Dana	Lake View	"	110
John Putnam		"	100
F. E. Colby	Sunapee House	"	20
George W. Colby	Hillside Farm	"	20
George Dodge	Maplewood House	"	20
John Y. Gardner	Prospect House	"	20
Chase & Martin	Pleasant Home	George's Mills	60
E. P. Stickney	Solid Comfort	" "	12
E. G. Chase	The Elms	Sunapee	
N. P. Barker		"	
E. R. Sargent		"	25
John S. Whipple	Straw Cottage	George's Mills	12
L. F. Bartlett		" "	20
John C. Purington		Sunapee	14
SURRY.			
D. B. C. Hill	Hotel Surrey	Surry	15
E. H. Joslin	Joslin Farm	"	
Daniel Wilder	Sunny Side	"	8

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
SUTTON.			
Keysar & Putney	Prospect House	North Sutton	30
W. P. Sargent	The Elms	" "	30
John Pressey	Meadow Farm	" "	25
John H. Keysar	Twin Pine	" "	20
Henry H. Bell	Maple Cottage	" "	14
J. G. Huntoon	Huntoon House	" "	25
C. E. Hosmer	Penacook	" "	18
George Bailey	Keysar Lake House	" "	16
C. H. Kohlreausch, Jr.	Hillside Farm	" "	
James M. Sargent	Woodbine	" "	12
Henry V. Little		" "	14
Fred A. Felch	Brookside Cottage	" "	12
Orrin M. Humphrey	Pleasant View	Sutton	20
SWANZEY.			
F. P. A. Kinson	Maple Hill Farm	Swanzey	
C. H. Holbrook	Highland House	"	30
TAMWORTH.			
Mark E. Robertson	Chocorua House	Tamworth	60
A. E. Wiggin	Wiggin House	"	50
N. H. Varney	Woodbine Cottage	"	18
Albion Blaisdell	Fair View	"	15
L. M. Schenk	Eagle Cliff	"	30
J. S. Remick	Rest Cottage	"	10
Lowell Ham		"	
Otis G. Hatch	Riverside Cottage	"	20
George W. Roberts		"	
L. D. Blake	Sunset Cottage	"	12
J. A. Wiggin	Robinson Cottage	"	10
J. R. Perkins		"	12
Frank Blaisdell	Beechwood Cottage	"	14
Kate Sleeper	Wonolancet Farm	"	30
Charles H. Remick	Wankanete	"	25
Nathaniel Berry	Maplewood Cottage	"	9
Augusta A. Stevenson		"	
David Morrill		South Tamworth	
George C. Whitney	Willow	Tamworth	10
William Perkins		South Tamworth	
TEMPLE.			
Mrs. G. D. Young	Mountain View	Temple	25
Mrs. Josiah Fisk		"	10
Mrs. E. E. Colburn	Pleasant View	"	15
Mrs. D. C. Bragdon	Highland Farm		12
Mrs. F. G. Shedd	The Chestnut	Temple	11
Mrs. N. Holt			
Mrs. S. B. Farrar	Forest Farm	Wilton	
THORNTON.			
A. H. Kendall	Kendall House	Thornton	20
J. Parker	Hix Mountain	Woodstock	35
W. Merrill		Thornton	
TILTON.			
Henry Q. Dalton	Lakeside House	East Tilton	35
Mrs. Lydia C. Sanborn	Lakeview	" "	25
Nelson A. Philbrook	Riverside	Tilton	
George A. Philbrook	Philbrook		45
W. H. W. Rollins	The Elms	East Tilton	20
Nelson H. Elms			40

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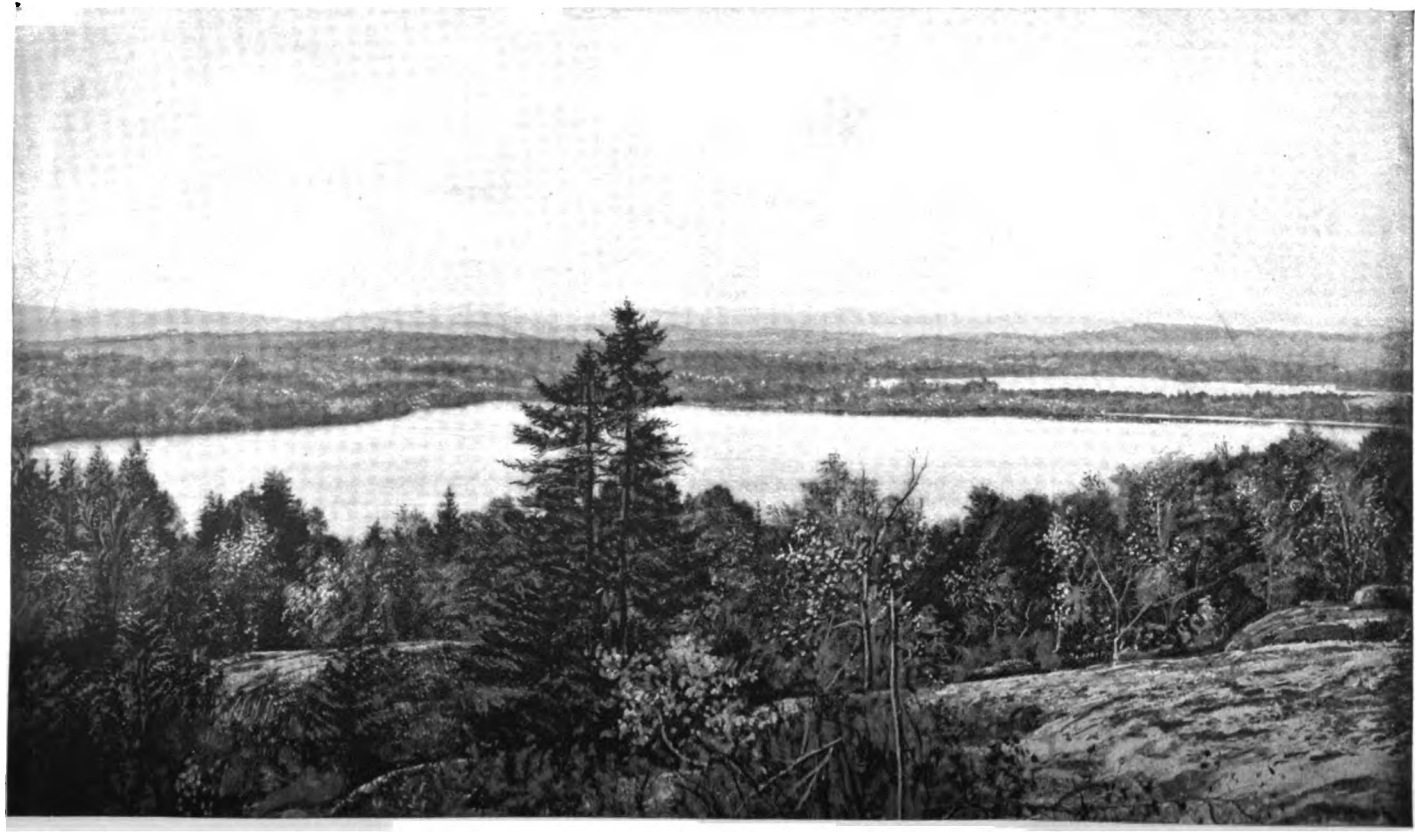

LITTLE SUNAPEE LAKE. — NEW LONDON.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
TROY.			
John L. Perry	Monadnock House	Troy	30
TUFTONBOROUGH.			
D. D. Wingate	Wingate Farm	Melvin Village	30
Charles Wiggin	Maple House	Mirror Lake	
Joseph C. Blake	Lakeside	" "	25
John A. Edgerly	Edgerly House	" "	25
Mrs. C. H. Shepard	Lakeside Cottage	Melvin Village	10
Francis Straw	Fair View	" "	12
G. E. S. Dearborn	Enon	Tuftonboro' Centre	
C. W. Purkham		" "	16
Jacob Hodgdon	Bald Peak House	Melvin Village	14
D. M. Smith		" "	20
Frank Libby		Tuftonborough	
UNITY.			
W. S. Upton	Unitage House	Unity	75
Wm. H. Whitemore	Elm Dale	Claremont	10
E. H. French	Maplewood House	Unity	
H. H. Roundy		"	
J. E. Reed	Hillside Farm	"	
WAKEFIELD.			
B. H. Pike	Union House	Union	20
W. F. Merrow	Davis House	East Wakefield	
Samuel Kershaw	Sunny Side	" "	
J. C. Penny	Elm	Union	25
C. B. Remick	Sanborn House	Wolfeboro' Junction	
James W. Hill		E. Wakefield Depot	20
J. C. Philbrick		North Wakefield	20
A. Wentworth	Oak Hill Farm	Woodsman	14
Henry C. Tibbetts	Elmwood Inn	Wakefield	40
L. G. Waldron	Valley Grange	North Wakefield	10
H. B. Fellows	Maplewood Inn	Wolfeboro' Junction	30
C. H. Garland		Union	15
John Kimball	Maple Ridge	"	35
Alvah S. Garland		"	
Hiram W. Hutchins		Wolfeboro' Junction	
John F. Garland	Garland House	South Wakefield	50
John F. Farnham		Wakefield	
Asa Brown		"	
Miss H. L. Frobisher		"	
Mrs. Susan C. Davis		E. Wakefield Depot	
John W. Kimball		Wolfeboro' Junction	35
George F. Piper		"	
Isaac W. Fellows	Lovell Lake	" "	20
John D. Waldron		Woodsman	
H. R. Waldron		"	
Peter C. Young		North Wakefield	
WALPOLE.			
C. R. Crowell	Elmwood House	Walpole	75
George E. Sherman	Dinsmore	"	50
Miss Eliza Barrett		"	
Henry A. Huntley	Cold River House	"	30
Mrs. M. H. Blake	Blake Cottage	"	12
Miss Harriet C. Hodgkins		"	
WARNER.			
M. M. Fisher	Hillside Farm	Warner	20
A. J. Hook	Kearsarge Hotel	"	40
Walter Sargent	Elm Farm	"	20
Mrs. Hollis Towns		"	20

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
WARNER.—*Continued.*			
Miss Mattie Burbank	...	Warner	10
Edwin George		"	
Fred C. Brockway		"	
Thomas W. Nelson		"	
WARREN.			
J. F. Thayer	The Moosilauke	Warren	100
A. L. Merrill	Merrill's Mountain	"	35
D. F. Stetson	Stetson House	"	8
G. H. L. Head	Moosilauke	"	60
Rev. L. W. Prescott	Riverside House	"	10
J. F. Merrill	Waternomee Cottage	"	16
Mrs. George C. Clifford		"	
Prof. D. A. French	Maple Cottage	"	8
A. M. Pillsbury	Clover Nook Cottage	"	6
WASHINGTON.			
T. S. Stowell	Lovewell	Washington	22
H. B. Millen	Washington Farm	"	32
H. M. Bowman	Danforth House	"	
A. T. Wright	Fisher Farm	"	15
WATERVILLE.			
S. B. Elliott		Waterville	
WEARE.			
Mrs. S. E. C. Allen	Allen House	Weare Centre	30
Charles W. Everett	Everett House	North Weare	10
Henry Davis	Elm Farm	" "	18
H. O. Chase	Pinnacle Farm	" "	20
Eben B. Bartlett	Mountain View House	South Weare	25
H. R. Nichols		" "	
Elijah Dow	Forest Farm	North Weare	14
J. L. Dow	Prospect House	" "	10
B. E. Hollis	Hollis House	" "	20
WEBSTER.			
Charles H. George	Long Pond	Webster	12
Andrew J. Flanders	Oakland Farm	"	25
Joseph B. Thurber	Highland Farm	Mast Yard	18
W. F. Wadleigh	Ridge Farm	Webster	15
Tyler C. Sweatt	Glen Cottage	"	15
Henry F. Pearson		"	
Daniel Scribner		"	
F. B. Sawyer		"	
James Goodhue	Grove Hill	"	8
J. L. & H. H. Gerrish		Mast Yard	8
WENTWORTH.			
J. W. Whitcher	Wentworth House	Wentworth	
William C. Pillsbury		"	
Van Merrill		"	8
George Plumer		"	10
F. D. Elsworth		"	16
Alphonso Brown	Brookside Cottage	"	6
Laura B. Elsworth		"	8
Francis E. Goodell		"	6
Edward G. Tenney		"	12
WESTMORELAND.			
George Cobb	Pynchon	Westmoreland	
William Brown	Brown's Cottage	"	10

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MASSABESIC LAKE. — MANCHESTER.

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SUMMER HOTELS AND BOARDING-HOUSES.—*Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
WESTMORELAND.— *Con.*			
Mrs. Isaac Derby	Derby House	Westmoreland	
N. Littlefield	Pleasant Hill Farm	"	12
WHITEFIELD.			
M. F. Dodge & Son	Mountain View	Whitefield	85
H. W. Fiske	Fiske House	"	40
H. J. Bowles	Kimball Hill	"	
Ira A. Mussey	Pond View Farm	"	15
J. A. Goodwin	Prospect Cottage	"	14
Mrs. E. M. Patten		"	
H. M. Leonard		"	
James Hunt		"	
WILMOT.			
Dr. Joseph Hicks	Winslow House	28 School Street, Boston, Mass.	100
WILTON.			
S. B. Senter	Everett House	Wilton	75
Levi Putnam	Grove	"	
E. P. Hutchinson	Pine Cliff	"	
Charles Moore	Summit Cliff	"	
A. D. Abbott	Abbott Hill	"	10
Rodney Perham	Highland Farm	"	
E. M. Moore	Sunset Bank	"	12
Charles Wilson		"	
G. M. Boynton		"	
Harvey Barnes		"	
E. C. Curtis		"	
W. W. Burton		"	20
WINCHESTER.			
E. A. Winter	Winchester Hotel	Winchester	
Henry Courillard		"	
WINDHAM.			
J. W. Dinsmore	Lake View House	Canobie Lake	20
Mrs. M. E. Call	Elm Farm	Windham	20
Mrs. E. M. Cutting	Pine Hill Cottage	South Windham	16
J. A. Moore	Sunset Farm	Londonderry	15
G. W. Noyes	Noyes Farm	Canobie Lake	18
G. W. Johnson		" "	
M. R. Page		" "	
Mrs. J. S. Clark		Windham Depot	12
Abel Dow & Son	Granite Grove	Canobie Lake	
H. E. Reynolds		West Windham	
J. G. Bradford	Willow Cottage	Windham	10
WOLFEBOROUGH.			
Charles H. Rollins	Pavilion	Wolfeborough	
Daniel Horn	Belleview	"	
Levi Horn	Glen	"	40
C. W. Gilman	Lake View	"	20
J. H. Warren	Bay View	"	
John L. Wiggin	Maple Cottage	"	14
Mrs. R. R. Davis	Elm House	"	
W. B. Randall	Randall House	"	15
H. B. Stewart	Stewart House	"	20
W. B. Fullerton	Pebble Cottage	"	
S. A. Meadon	Willow	"	25
W. D. Hersey	Hersey Cottage	"	20
S. N. Furber, Jr.	Fair View	"	15
Daniel Cotten	Cotten House	East Wolfeborough	

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SUMMER HOTELS AND BOARDING-HOUSES. — *Continued.*

Proprietor or Landlord.	Name of House.	P. O. Address.	No. of Guests.
WOLFEBOROUGH. — *Con.*			
Henry Cotten	.....	East Wolfeborough	.....
J. W. Piper	.....	Wolfeborough	20
S. W. Fay	.....	"	.....
WOODSTOCK.			
Buchanan & Willis	Deer Park	North Woodstock	200
A. W. Sawyer	Fair View	" "	60
S. S. Sharon	Mountain View	" "	70
George F. Russell	Russell House	" "	75
Charles H. Russell	Cascade	" "	30
W. L. E. Hunt	The Innette	" "	20
C. L. Parker	Parker	Windham	25
J. H. Batchelder	Alpine House	North Woodstock	90
N. Boynton	Pemigewasset Cottage	Woodstock	.....
J. Parker	Hix Mountain House	"	.....
W. F. Butler	Woodstock House	North Woodstock	20
W. A. Smith	.....	" "	23
M. H. Kendall	Central Cottage	" "	18

N. J. BACHELDER,
Secretary.

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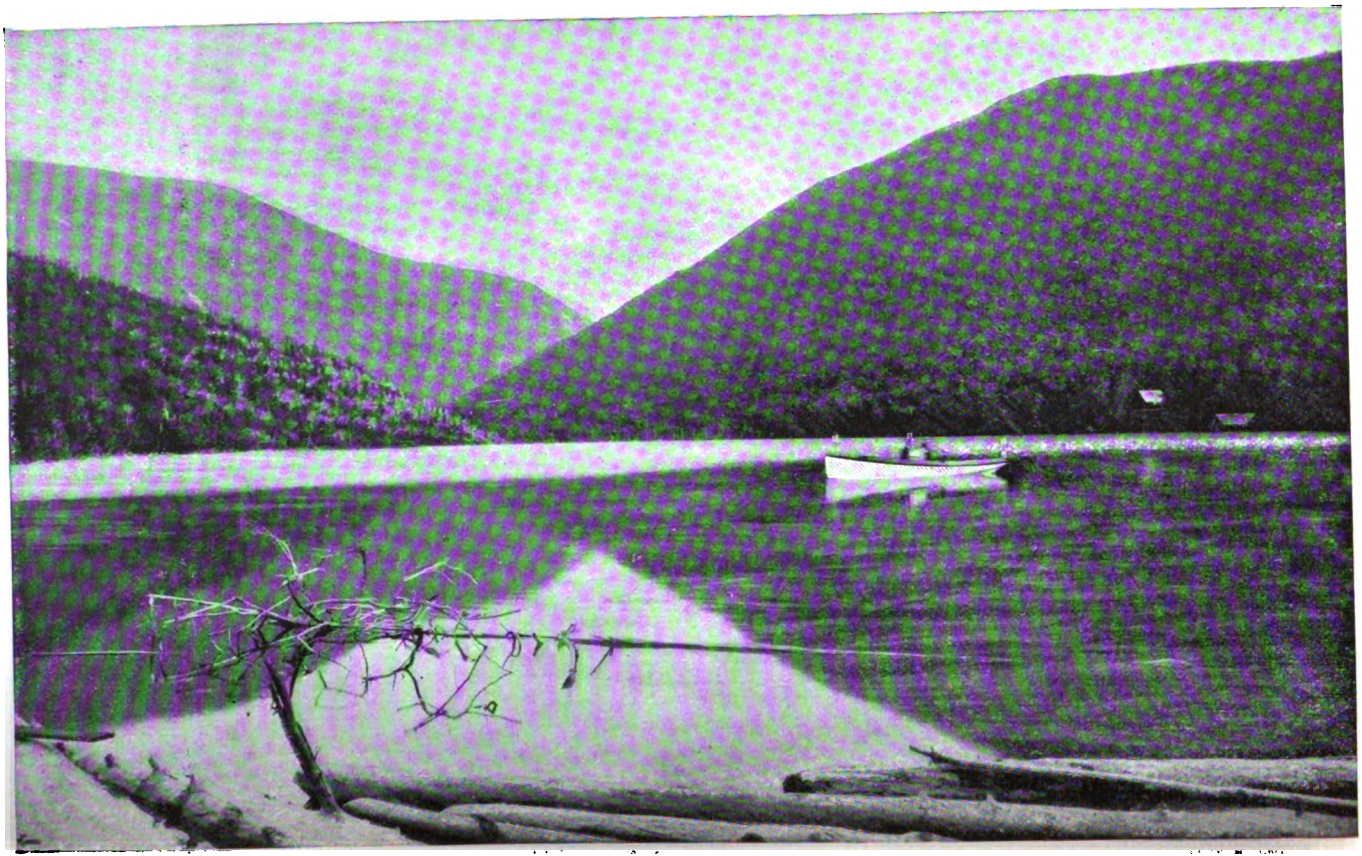

ECHO LAKE. — FRANCONIA NOTCH.

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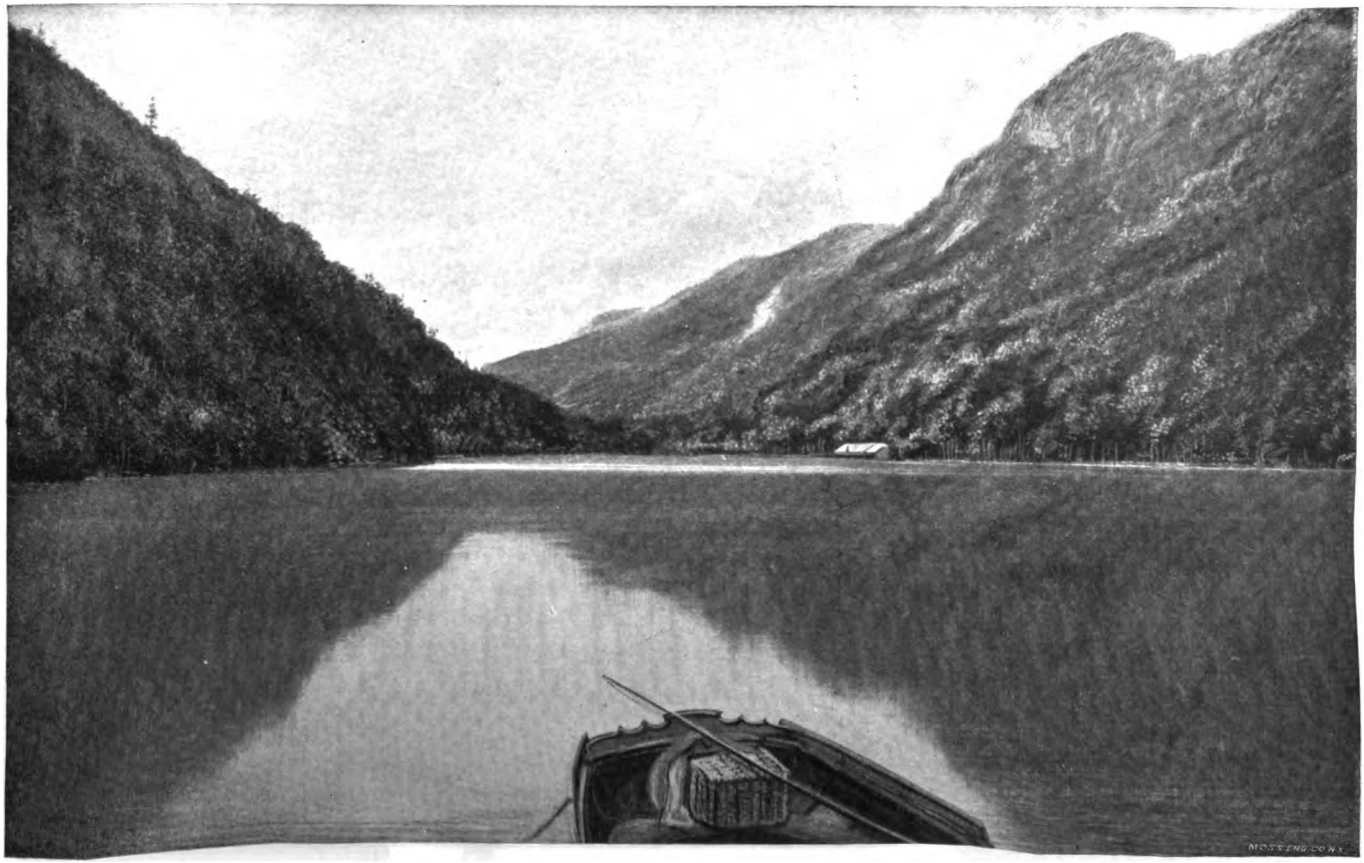

PROFILE LAKE. — FRANCONIA NOTCH.

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AGRICULTURAL ORGANIZATIONS.

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GRANITE STATE DAIRYMEN'S ASSOCIATION.

OFFICERS.

J. M. Connor, *President*	Hopkinton.
C. H. Waterhouse, *Vice-President* . .	Cornish.
G. B. Williams, *Vice-President* . .	Walpole.
J. L. Gerrish, *Secretary*	Webster.
N. J. Bachelder, *Treasurer* . . .	Andover.

TRUSTEES.

O. M. Tenney, *Rockingham County* .	Hampstead.
A. B. Locke, *Strafford County* . .	Barrington.
G. S. Philbrick, *Belknap County* . .	Tilton.
L. T. Brown, *Carroll County* . . .	Tuftonborough.
J. G. Tallant, *Merrimack County* . .	Concord.
W. E. Gay, *Hillsborough County* . .	Hillsborough.
D. W. Rugg, *Cheshire County* . .	Sullivan.
C. P. Rossiter, *Sullivan County* . .	Claremont.
W. D. Baker, *Grafton County* . .	Quincy.
L. T. Hazen, *Coos County* . . .	Whitefield.

SECRETARY'S REPORT.

While many have predicted that dairying would be overdone, we find no decline, but a positive quickening in the market, both East and West, at the time of making this report (October 20th).

The causes, in part, may be only temporary, viz.: local drought in the Western States; but the rapid development of the feeling against bogus products unlawfully sold, both East

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and West, has met with favor among all dairy and creamerymen and consumers of butter generally. Law-breakers have been vigorously followed in this State until dealers are not inclined to take out licenses, and the traffic seems at a standstill to-day. This gives a place for just so much more genuine butter, and more, for people who have tasted for the last few years only with feelings of uncertainty, now require more butter, in proportion with the increased confidence in what they are eating.

With plentiful general harvests, and an unusual store of hay, rowen, and corn, we see no reason why dairymen may not expect soon to enter one of the most prosperous years known since the war. At present a preliminary survey of a railroad to the New Boston creamery, the steady growth of the Guernsey dairy at Contoocook — the product of both of which largely goes out of the State — with the feeling of confidence and push on the part of coöperative establishments, indicate an increase of such manufacture, while the steady growth of our manufacturing towns and cities encourages those who have special customers for private dairy products.

We feel that the meetings held during the year, a report of which is herewith submitted, and which has been quite generally published by our agricultural papers, have been very helpful to the dairymen of the State, and we ask that they may continue to give that encouragement to the Granite State Dairymen's Association which is given to similar organizations in other dairy States.

MEETING AT LANCASTER, NOV. 25, 1890.

Upon invitation of the Grange, through W. R. Stockwell, the association visited this locality in the eastern part of Lancaster, and held a successful meeting in a thrifty village known as "Grange."

The meeting was called to order by Past Master Stockwell, who introduced President Connor, who remarked: I hope

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that in exchange for the facts which members of the association hoped to impart for the benefit of the farmers present, others of equal importance may be brought out in the discussion for our mutual benefit.

As this was the first meeting of the association in Coös county, the president briefly explained the objects and work of the association and the advancement which had been made in private dairies and creameries since the association was formed. He thought the improvement largely due to the discussions carried on by the association, Board of Agriculture, and the Grange. He also spoke briefly of the starting of a new creamery in his town growing out of efforts made by the secretary of the Granite State Dairymen's Association, in calling the attention of Massachusetts parties to the superior character of the dairy stock of Hopkinton and vicinity, which sprung from a pure Alderney or Guernsey bull and heifer brought into town by Joseph Barnard's father.

The president then introduced Secretary J. L. Gerrish, of Webster, who addressed the meeting for half an hour on "Dairy Stock."

The speaker did not advise farmers generally to spend large sums in purchase of thoroughbred stock, but to breed in dairy lines with pure bulls and the purchase of grade females of the same breeds, as good as could be had by buying young females within the limits of their means.

A good cow is as necessary to dairymen now, as good machinery is indispensable to the manufacturer.

The best take no more room, and little, if any more feed, and there is great satisfaction in owning such stock besides the profitableness of it.

Mr. Wm. Freeman said he had been interested in the remarks of the secretary. He would separate the cheese from the butter cows, and grade up from good cows, increasing the feed and care as he approached the thoroughbred.

Mr. Way thought that a good butter cow ought also to make good cheese, although he was not sure that they would make as much of it.

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W. D. Baker believed the secretary was right in urging the importance of having cows adapted to the work required. He had figured carefully from such statistics as he had, and believed that a large proportion of the cows in the State could not be fed at a profit.

MR. R. CARTER: How may we know when we have the right kind of stock?

THE PRESIDENT: By testing the milk; we should not trust to guesswork.

Treasurer N. J. Bachelder was next introduced. He said that it was a matter of congratulation that 5,000 cows had been added to the dairy stock of the State, and ten or fifteen creameries added within the last year. There are thirty-nine creameries running to-day, and two or three more about ready to start. Private dairying has also been on the increase and their products are improving in character and quality.

He did not propose to instruct dairymen how to feed in individual cases, but to call attention in a short "chalk talk" to certain underlying principles. He called attention to charts showing the German tables of feed and proportionate values. Although not infallible, they had been compiled as the result of a very large number of experiments. The chemist could as readily take different feeds apart and separate them as readily as a farmer can sort apples, or potatoes. Certain results can be attained thus and rations balanced properly from such feeds as the markets afford, thus making the proper proportion of albuminoids and carbohydrates, according to the kind of work required of the stock we are feeding.

Different rations of the same cost would make a change of ten per cent in production, according to the way the ration was balanced.

Mr. Way asked why cows gave poorer milk in the fall?

Mr. Bachelder said he was not sure they did, if fresh cows.

QUESTION: How about feeding cotton-seed?

ANSWER: I would not feed it too freely at first as it is a heavy feed.

QUESTION: Would you not feed any grain moderately at first?

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ANSWER: Yes.

Mr. Freeman asked if he could make good butter from ensilage?

ANSWER: Yes, from good ensilage.

A rambling debate on feeding generally was continued for some time to the close of the afternoon meeting.

EVENING SESSION.

The time of evening was mostly taken by the president and W. D. Baker.

DAIRY DETAILS.

W. D. BAKER, QUINCY, N. H.

A short time ago I received from the secretary of our association an invitation to speak at a meeting somewhere in Coös county some time this month, and in the same letter he informed me that the subjects of breeding and feeding had already been assigned, and asked me to take the milk from the milk pail through the various manipulations to the final object of the dairyman, namely, gilt-edged, golden butter ready for the market — that is, to enter into the details and the whys and wherefores of butter-making.

Now I am always glad of an opportunity to meet my brother dairymen and have a little experience meeting with them; but I must confess that the subject assigned me for this meeting was one about which so little was really known that I felt some hesitation about attempting to talk to you upon it; but if we don't try to profit by the experience of others, and keep our respective talents done up in napkins, we shall soon be left far behind in the race of progress; so I have come both to give and receive.

I notice from the list of subjects selected for discussion at this meeting that we are to consider butter-making the particular object of the New Hampshire dairymen, rather than the production of milk for the market, or for making cheese; and with this in view, the subjects chosen are breeding, feeding, making, and the utilization of the by products.

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Breeding is very important, for a first-class article cannot be produced from poor material and you cannot make gilt-edged butter from the milk of poor cows; neither can enough be made per cow, to pay the cost of the feed alone, from the average cow of this or any other State, for the cow that will not make more than one hundred and fifty pounds of butter per year (and this is much better than the average), will not pay for her keeping as a butter cow, for it will cost more than twenty-five cents per pound aside from the expense of making, so you see that breeding has a great deal to do with successful dairying.

Feed is likewise of great importance, for even a good cow cannot produce a profit unless she is furnished a sufficient quantity of proper food and drink; but after the milk is produced, success depends upon the quantity and quality of the butter obtained therefrom, and this in a great measure depends upon the dairyman himself.

A city friend once said to me, "I don't see what you folks find to talk about at your dairymen's meetings, butter-making is simple enough. All you have to do is to put the cream into the churn and churn until the butter comes."

I replied that his question reminded me of the old lady who said that for her part she could not see why folks made such a fuss about papering a room. "All you have to do is to stick the paper at the top and smooth it right down."

But I was asked to begin at the strainer, and this part of the work cannot be too carefully done; but after all, much more depends upon keeping the dirt out than trying to strain it out after it gets in, for you can't strain out bad flavors and the milk can easily be spoiled by carelessness before it comes to the strainer.

Even with the greatest care some dirt will remain and you have only to visit some creamery and examine the bowl of a separator after a day's run, to fully convince you that the greatest care is none too much. In fact, the saying, "cleanliness is next to Godliness," is very applicable to every department of dairying.

The next question is, what to do with the milk after it is

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strained. Now I am well aware that I am treading on dangerous ground for there are many systems and each has numerous advocates who are ready to take up cudgels with any one who does not think their particular method the best, so I shall endeavor to be impartial and leave it to you to judge what method is best for each individual, as what is one man's meat may be another's poison; but after all, no method will be a success except the dairyman is a success also.

There are three systems in use at the present time, viz.: the open pan, the deep cold setting, and the centrifugal separator (of which there are a number of kinds including the butter extractor), and they are all good in their place.

I do not believe any better butter can be produced by any system than can be made with the old-fashioned pans, such as our grandmothers used, provided the dairyman can control all the needful conditions of temperature, etc.; but except for a very short period in the year this is practically impossible, and aside from this there are at least two other important reasons why the open pans must go — first, the large per cent of the butter fat is lost in the skimmilk and buttermilk by this method; and second, the amount of labor involved in taking care of the pans, etc.

An eminent authority estimates that on the average twenty per cent of the butter fat contained in the milk is lost in the skimmilk and buttermilk in private dairies, and as this means one pound lost (or at best, fed to calves or pigs) to every four pounds secured, here is a very large leak to be stopped. In practice it is next to impossible to effect a complete separation of all of the fat, and perhaps it is not desirable to do so, for the best flavored butter is that which is made from the cream that is first obtained, and numerous experiments have demonstrated that cream obtained from re-setting milk from which the greater portion of the cream has been previously taken, will make butter of the very poorest quality, but, while it may not be desirable to get the "last wrung drop," there is certainly no need of having so large a per cent of the butter fat wasted by ignorant or careless handling of the milk and cream. At the test at

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Hanover, in January, 1889, by one method only, .19 of one per cent was lost in the skimmilk, .21 of one per cent by a second method, and .22 of one per cent by a third, which shows what can be done by proper care of the milk. I will speak of the buttermilk later.

Leaving out of consideration the open pans, we have two general systems before us, namely, the deep cold setting, and the centrifuge, and I will only say that both have many good points and it must be left to the individual to determine by actual trial which is the better suited for his circumstances. The high cost of the separator has prevented the great majority of our dairymen from giving it a trial, and they have therefore been obliged to resort to some method of deep setting. I understand that a separator has recently been placed upon the market at the low price of $100, and this may work almost a revolution in the private dairy business; but for the present, as so large a proportion of our dairymen are using the deep setting system, we will confine our remarks to that method without, however, intending any slight upon the separator.

I shall not attempt to say which particular system of deep setting is the best, for I have no desire to bring a hornet's nest about my ears; but will take it for granted that you have some one of them, and we are now ready to take care of the strained milk.

The all-important question now is that of temperature, and, in my opinion, upon the correct solution of this problem depends in a great measure, the success of the private dairy. In fact, from the time you get the milk until the butter is marketed this question of temperature is first and foremost.

During the past two years I have made a large number of experiments, and I find I get the best results in obtaining the most complete separation when there is a difference of about 50 degrees F. between the temperature of the water and the milk when set in the creamery. I have obtained just as good results by setting the milk (which has been heated to 105 degrees F. by the addition of water at 135 degrees F.) in

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running water at 55 degrees F., as with ice water at 40 degrees F. and milk at 85 to 90 degrees F.; and I will add that I have uniformly had good results from the addition of about $\frac{1}{10}$ warm water to the milk at setting, especially when the milk contained a large per cent of butter fat. I notice that these results correspond with those obtained by a number of dairy specialists, and if they prove correct the ice problem is in a fair way of solution.

Practically, all of the cream may be obtained in twelve hours by the deep setting method; but unless there is some necessity for skimming then, I prefer to let the milk stand twenty-four hours, as the cream is then of a greater density, and, while less in quantity, contains all the butter fats obtained in the shorter period and requires less work to get it into butter.

The cream should be kept at a low temperature until a sufficient quantity has been secured for a churning, and whenever any cream is added the whole should be thoroughly stirred. When enough has been obtained, and it should not be kept too long, the question of temperature again confronts us, for upon this and the consistency, or as it is usually termed the ripeness, of the cream depends the amount of butter fat you recover from the cream and consequently the amount lost. And it is in churning that the greatest loss of butter fat occurs, as a rule.

From a number of tests I am convinced that sweet cream cannot be churned at the ordinary temperature, say from 62 to 68 degrees, without a very large loss arising from the butter fat that will remain in the buttermilk.

If cream is to be churned at a temperature of above 50 degrees, it must be ripened to some extent, and the higher the temperature the more complete the ripening must be.

In one of the tests made at the Experiment Station last season, sweet cream was churned at a temperature of 49 degrees and only .47 of one per cent of fat was lost in the buttermilk; but it took three hours and thirty-five minutes to do it, and no remark was made about the quality of that butter.

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In another test, a certain quantity of cream was divided into two equal parts and the first was churned while sweet and the other was ripened until it became acid and somewhat thick. Both lots were churned at the same temperature, 54 degrees (quite low, as you observe, and favorable for the sweet cream), with the following results: The sweet cream required 32 minutes for churning, and there was left in the buttermilk .81 of one per cent of butter fat; while the ripened cream took 13 minutes for churning, and only .26 of one per cent was left in the buttermilk. There is, however, quite a difference in the flavor or taste of sweet-cream butter and sour-cream butter; and we should endeavor to give our customers just what they want if possible, or, if we can, make them believe that our butter is just the kind they want. There is still another question in regard to the temperature and proper handling of the cream and that is, its effect on the natural color of the product.

In my opinion, if you have cows that will make June butter at any time of the year, it is not the fault of the cow if you have to use "dye stuff" in the winter.

Perhaps you may think this a bold statement; but I have often seen butter made from the same milk that had been divided into two or more equal parts and differently treated, that varied in color from only a trifle more yellow than lard, to that marked "perfect" by a committee of experts. It was made in January, and no coloring matter was used in any of the samples. I repeat therefore, that with good cows there is absolutely no need of coloring the butter at any season of the year.

Proper temperature, consistency of cream, and especially God's sunlight and pure air are the only materials necessary for butter color, provided you have good cows and give them plenty of suitable food and pure water. I say suitable food, as you cannot make June butter from some feeds, particularly cotton-seed meal. I think it is pretty well settled that butter should be gathered in granular form, the grains to be about the size of kernels of buckwheat, or less; while in this condition it should be thoroughly washed with pure water

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(and here the temperature question comes up again), of a temperature that will keep the butter below 57 degrees; it will thus retain its granular form and be in the best possible condition for salting, which may be done with strong brine, or by sifting dry salt upon the butter while in its granular form, the method depending largely upon the amount of salt your customers require. Butter will only absorb about one half ounce of salt to the pound and if more is required it has to be added; I prefer to let the butter stand awhile after doing this in order that the salt may be diffused as completely as possible and thus do away with as much use of the butter worker as possible, as the more you try to work the salt in, the greater risk you run of injuring the grain of the butter. Of course some working will be required to expel the excess of moisture and render the butter compact enough for the print or tub, but don't overwork.

The temperature of the butter when worked should be 60 degrees, or a little less, in summer, and about 62 in winter; but it depends somewhat upon the feed, as butter made from some feeds is of much higher melting point than with other feeds. Cotton-seed meal especially gives a high melting point. Care should be taken not to leave too much moisture in the butter, as it will cause it to shrink in weight; commission men are fully aware of this fact and sometimes throw off quite a large per cent for shrinkage. It should not be too dry, however, as then it will be of poor grain and crumbly.

Gilt-edged butter, as a rule, does not contain more than 10 or 11 per cent water and about .5 of one per cent casein, and if you wish to make it you must take care that the buttermilk is thoroughly washed out and then that the excess of water is carefully worked out.

There are many details that I have passed over, but I will not try to enumerate them as I fear I have already severely tried your patience. Thanking you kindly for your attention, I will close by saying that I sincerely hope that you will thoroughly discuss this question of butter-making at this meeting, for as I told you in the beginning we come here to receive as well as give.

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ANNUAL MEETING AT CONCORD, JAN. 20, 1891.

After brief appropriate remarks by President Connor, and words of congratulation, he then said: The first thing this forenoon is a talk by Mr. Bachelder, Secretary of the Board of Agriculture, upon a subject that is of interest to us all.

FEED FOR THE DAIRY.

BY N. J. BACHELDER.

Mr. President and Members of the Dairymen's Association:

For two hundred days in the year the 111,335 cows in the State of New Hampshire are fed at the barn, and the most economical production and combination of the various fodders and grains is a matter of great importance.

It is a very different question that confronts the dairyman of to-day from that with which he had to deal when our farms first came under cultivation. Then a fertile soil, rich in all elements of plant growth, produced heavy crops, and the farmer, forgetting that the bank from which he was drawing annual dividends would become exhausted, gave his entire attention to converting those crops into a marketable product in the shape of beef, pork, mutton, wool, or butter, with little regard for the economical combination of feed and less opportunity to supply any deficient element, had he the disposition to do so. The money thus obtained was carefully locked up in interest bearing securities, and as a result we have had rapidly increasing savings bank deposits and in many instances the deterioration of farm lands in about the same ratio. This is the condition that stares us in the face to-day, and renders intelligent and thoughtful action necessary on the part of the dairyman if he would succeed. Fortunately there are some things to afford us special aid in this matter, prominent among which may be mentioned the introduction of nitrogenous substances as articles of food, and a better under-

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standing of the laws governing the uses of the different elements of feeding stuffs.

The experiment stations of this and foreign countries are annually expending vast sums of money in making investigations and we have the results obtained as our guide. While their efforts are properly directed in experimentation, it is the province of Dairymen's Associations, Boards of Agriculture, Granges, and kindred organizations to discuss with the people the laws which have thus far been formulated.

The chemist has been able to separate the fodders and grains into the elements of which they are composed, giving the amount of those elements in each instance. He tells us that the nutritive elements are albuminoids, substances resembling the white of eggs and containing about sixteen per cent of nitrogen. These are called the nitrogenous constituents. Carbo-hydrates, substances composed of starch and sugar. Also one other element, fat.

In addition to these are also found fiber and ash, but the three previously mentioned are termed the nutritive elements and exist in all articles of fodder and grain in varying proportions. It had been determined by costly experiments in foreign countries long before the establishment of experiment stations in our own, that animals require for the best results certain quantities of albuminoids, carbo-hydrates, and fat; and it is our business, as practical dairymen, to supply those elements in the cheapest possible manner, taking into consideration the location and resources of our farm, the health of our animals, and the material value of different fodders and grains. The quality of the product should also be taken into consideration, but this is more attributable to breed than to food influence.

The most economical fodder ration depends somewhat upon the location and soil of the farm, but there are very few instances where the dairyman should not depend upon ensilage as the main fodder. The prejudice against it has long ago subsided, and it has become an established fact that good ensilage will make as good milk and as good butter as any dry feed.

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It has also been proven that two and one half tons of corn ensilage is equal in feeding value to one ton of herd's-grass hay, and it is our business to determine which we can produce the cheaper. On land which can be cultivated by horse-power, this ensilage can be grown and packed in the silo for $2.50 per ton, allowing for the usual contingencies and accidents. An average crop of ensilage compared with an average crop of timothy hay makes the feeding value of the former about twice per acre that of the latter. Except upon farms too rocky to be cultivated by horse-power, there is no reasonable excuse for a dairyman in not using ensilage as the main fodder ration if he would reap the greatest profit.

Of the grasses grown for dairy feeding, the most valuable, all things considered, is the clover. It flourishes best ón tenacious soils and stiff loams. It should be sown in the spring of the year and is often sown with perfect success on the late snows of March and April. In clover hay the nutritive elements are combined in almost a perfect ratio for dairy animals, and the only reason why it is not a perfect feed in itself is the fact that a cow would be unable to digest a sufficient amount to obtain the requisite quantity of albuminoids, carbohydrates, and fat.

In connection with the proper grains it is an excellent fodder, and the dairymen of the State would make no mistake in giving more attention to the production of clover.

Timothy grass forms a large proportion of what is commonly called English, or in some sections meadow, hay though it originated and was first cultivated in this country. It thrives best on moist, loamy soils, and is not well suited to very light, sandy lands. While it is doubtless the most profitable grass to grow for the market, there are other grasses which should receive a portion of the dairyman's attention.

Redtop is a grass familiar to every farmer in the country. It is the herd's-grass of Pennsylvania, while in New York and New England it is known by a great variety of names. It is well adapted to almost every soil, though it seems to prefer a moist loam. Its yield is less than that of timothy.

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The time of cutting grass depends very much upon the use we wish to make of it. If for working oxen and horses it should stand until a little out of the blossom, but for milch cows it should be cut when very green. Well known authorities claim it to be worth nearly twice as much for the dairy when cut at this stage as when allowed to stand to the time of seeding.

Upon farms so rough and moist that ensilage cannot be profitably produced (the number of which is small), an excellent addition to the fodder ration can be produced in the form of oat and barley hay. No dry fodder equals this for the production of milk and butter. Barley hay will be of the better quality but less can be produced per acre. From three to five tons of oat hay can be produced on an acre and affords the best substitute for ensilage that we have. It should be cut at the first appearance of ripening, as a delay of two or three days greatly reduces the feeding value of the crop. Corn stover is worth more as a dairy feed than is sometimes supposed, and careful experiments have proven it worth three fourths the price of the best hay per ton. The coarser varieties of grasses which are produced upon nearly every farm, may be more profitably fed in connection with a proper grain ration than when fed by themselves, for a grain may be selected and combined with the fodder in such a way as to make a correct nutritive ratio.

In substance we recommend for a fodder ration, ensilage with a small quantity of hay. In the absence of ensilage, we should substitute oat or barley hay, and next in order of excellence for the dairyman, we should name clover followed with timothy and other grasses.

The grain feed would depend upon the fodder ration used. We have stated that animals require the elements of feed in certain proportions, and the experiment stations tell us that in the case of dairy animals that ratio should be one part albuminoids to five and four tenths parts carbo-hydrates. Whatever the fodder ration lacks of making this proportion should be made up in the grain fed.

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We are assuming that a portion of the grain at least will be purchased, for in no other way can a dairy farm be made to sustain its fertility. The cost of the requisite elements in different grains and feeding stuffs will determine which to substitute, taking into consideration other conditions which we have mentioned.

Some articles must be selected rich in nitrogenous matter, and under this head we find cotton-seed meal, gluten meal, linseed meal, middlings, and shorts. There has existed a prejudice against all these articles of feed; but experience has proven that any of them can be fed in reasonable quantities without detriment to the animal or quality of the product. Cotton-seed meal takes a prominent place from the rich manurial value contained. It must be fed sparingly to animals for the first time, and always carefully, for an over-feed will cause bad results. Animals differ greatly in their digestive capacity and the amount each will digest must be determined largely by experiment. It is seldom profitable to feed more than three pounds per day to a cow of ordinary size, if we consider her continued usefulness in the dairy.

Gluten meal is not alway eaten readily at first, but cows will soon become accustomed to it. It is claimed to increase the flow of milk, but many affirm that the solids in the milk are not increased in the same proportion. Shorts enter largely into the dairy feed of the country, furnishing the nitrogenous elements in a healthy combination.

Roots of various kinds are an excellent article of feed for dairy animals; and when we consider their healthy effect upon the system, it is quite probable that they can be profitably grown as a supplementary feed for a first-class dairy when ensilage is not used. We have grown and harvested crops of carrots for $6 per ton and used them profitably in our dairy.

While animals should not be over-fed, they should be fed liberally. It requires a certain portion of the feed to sustain the waste of the system, and not much more of this, if the machine is running to its full extent than when doing less.

Every cow is born with a certain limit of production, and

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until that limit is reached she is not doing her most profitable work.

It is true that breeding is the leading factor in fixing the capacity of a dairy animal, yet the best breeding cannot overcome the want of proper feed, and it will require but a few generations of starvation to reduce the capacity of the best breed to a level with scrub stock. Feed liberally, if you have to feed fewer animals. Feed so your animals will give milk ten and one half or eleven months in the twelve. It is best that a cow should have a brief rest, but if she has been correctly bred her feed should be such as to make this period short. Do not discontinue the grain suddenly when this time arrives, for a highly-bred dairy animal will be susceptible to sudden changes of any kind. Feed regularly, at the same time every day. Anything that excites or disturbs a dairy cow has an effect upon the secretion of butter fat, and therefore absolute contentment should be given her. The feeding should be done with so much regularity that thirty minutes before the feeding time will find the animals quietly chewing their cuds.

Our best dairymen now practice feeding but twice a day, giving the animals a longer time for rest, for the secretion of milk, and for digestion. After feeding has commenced in the morning, it should be continued until one half of the feed for the day has been given. This may require three hours or more. The same should be done at night, and in the meantime, the cows will have secreted more and richer milk than if frequently fed during the day.

A point of considerable importance, is the feeding of young heifers, both before and after they come into milk. While they should be liberally supplied with healthy food, they should not be given rich concentrated grains in large amounts. A heifer can be ruined for the dairy by an over-feed of corn or cotton-seed meal, while twice or three times the amount might do no harm fed to the same animal two years later. The third consideration we mentioned, was the manurial value of different grains, and this has an important bearing upon

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the subject. When the farmers of New Hampshire are paying more than $650,000 annually for commercial fertilizers, it would seem that this branch of the subject was worth careful consideration. It is our duty as dairymen to use all reasonable means to save and apply to our land the fertilizing material obtained by our feeding. Some grains, after serving the uses of the animal, have a much higher value in this direction than others. First on the list, is cotton-seed meal, furnishing four times the value of nitrogen, phosphoric acid, and potash, as does corn meal; gluten meal, furnishes three times; and shorts, twice the value of corn meal. Were their value the same for the production of milk and butter, this would be a matter of great importance in determining our economical combination of feed. The dairyman who feeds a cow during the 200 hundred days, 1,600 pounds of hay, 4 tons of ensilage, 600 pounds of corn meal, 400 pounds of cotton-seed meal, and 400 pounds of shorts, will have in fertilizing matter, if he has saved it, $20.54. This is upon a basis of nitrogen at 17 cents, phosphoric acid at 6 cents, and potash at 4½ cents per pound. The total amount represents the price which the farmer would have to pay for the same amount of plant-food delivered on his farm in the form of commercial fertilizers. In a large herd of cows this becomes a large factor. The same herd of cows fed upon hay alone, would leave but half the amount.

Professor Roberts, of Cornell University, is authority for the statement, that when the manure is carefully secured, the nitrogen, phosphoric acid, and potash therein contained, are worth, on an average, one half the value of the feed consumed. Careful attention to these facts will enable us to return to the soil some of the elements of which it has been robbed, without depleting our cash account.

In conclusion we would say, study the adaptation of your farm to the production of the various fodders, and produce the largest amount that can profitably be grown. Supplement this with nitrogenous grains purchased in the market. Become familiar with the composition of both fodder articles

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and grains. Consider 100 pounds of timothy hay, not simply as 100 pounds of hay, but as 3½ pounds of digestible albuminoids, and 48¾ pounds of digestible starch, sugar, and fat; consider 100 pounds of cotton-seed meal, as 31¼ pounds of digestible albuminoids, and 42¼ pounds of digestible starch, sugar, and fat. Know the composition of other grains in the same way. Then, knowing what proportion of each our animals need, we will be able to feed an economical ration. Save and apply the fertilizer obtained to the production of more fodder. Continue in this way with an eye single to success in the business, and you will increase your profits; your crops will increase, and you will have the satisfaction of knowing that you have caused "two blades of grass to grow where but one grew before," one of the proudest achievements of an American farmer.

THE PRESIDENT: We will now hear the report of the butter expert, Mr. Harris, of Boston.

REPORT OF THE JUDGE ON BUTTER EXHIBITS.

BY E. A. HARRIS, BOSTON, MASS.

Mr. President, Ladies and Gentlemen of the Granite State Dairymen's Association:

I appear before you the second time to award the points, based upon my judgment, of the exhibit of butter. In the first place allow me to say that I am disappointed not to see as large a display as at Plymouth last year. Last year I was very much gratified to see the large amount, and excellent quality of the exhibits; but this year, not only is it less in quantity, but I am sorry to see that it is inferior in quality. I presume one reason for this may be the high price of grain food that is purchased in the market, and especially of corn meal.

The total number of exhibits were twenty-five in butter. The first prize in creamery prints — there being only one entry — is given to the Hillside creamery, of Cornish, scoring eighty-eight points.

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In creamery tubs, the Haverhill creamery scored ninety points, and the Hillside creamery also scored ninety points, and first and second prizes should be divided between those two. The Hillside creamery took the third prize, scoring eighty-nine points.

The sweepstakes was carried off by the Short Falls creamery, of Epsom, that scoring ninety-one points. I think that honorable mention should be made of 22 A, ninety points, and 31 A, eighty-nine points.

There was but one exhibit in dairy granular, as there was but one in the creamery, and W. D. Baker, of Quincy, gets the first prize.

In dairy tubs, A. H. Colby, of Tilton, gets first prize, eighty-three points; J. W. Pulsifer, of Holderness, second prize, seventy-four points; and W. D. Baker, of Quincy, third prize, sixty-four points.

In dairy prints, the first prize is allotted to Joseph Barnard, of Hopkinton, eighty-eight points; the second to A. H. Colby, of Tilton, eighty-six points; and the third to Mrs. J. W. Pulsifer, of Holderness, eighty-one points.

In cheese there were six entries.

For plain cheese the first prize is given to J. W. Pulsifer, of Holderness; and the first and second to T. S. Pulsifer, of Campton.

For sage cheese, the first prize belongs to T. S. Pulsifer, of Campton; and the second to J. W. Pulsifer, of Holderness.

The Pulsifer family takes the cake in cheese this year, as they did last.

If there are any questions that you wish to ask me in regard to the awards, I shall be glad to answer them.

MR. PHILBRICK: In looking over your points, I find that this whole exhibit scores lower than it did last year. What is the greatest general fault you find in this butter?

MR. HARRIS: The greatest fault is in the flavor. The first point that you look for in butter, is the flavor.

MR. PHILBRICK: Do you make a difference between aroma and flavor?

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MR. HARRIS: No, sir. I always smell a piece of butter before I taste of it. I fix my judgment upon both.

MR. PHILBRICK: The flavor and smell are identical? That is, the one gratifies the sense of smell in the same proportion that the other does the sense of taste?

MR. HARRIS: Yes.

MR. PHILBRICK: You think that is true with gilt-edged butter?

MR. HARRIS: I think butter with good flavor has very nice aroma.

PRESIDENT: It is generally reported that our hay crop was well secured at a very excellent season, so this inferiority in the butter cannot be the fault of the quality of the hay. Do you attribute it to the fact that corn meal is higher in proportion to its feeding value than other concentrated foods, and hence is not fed so generally, — do you consider that to be the cause of the lack in flavor?

MR. HARRIS: I do, sir.

GOV. HOARD: I should like to ask you a question. It would be very interesting to know from the parties who made this butter, as to when those cows were fresh cows. Five or six months in gestation makes a great difference in the flavor of butter. And consequently, if you want to make fine-flavored butter, you have to put fresh cow's milk in it. May that not be a very important factor in this matter of flavorless butter in the winter? I do not know what the rule is here, whether these parties who have made this butter put on exhibition here, had their cows come in fresh in the fall or not, but I do know that this becomes a very important factor in the matter of flavor.

MR. HARRIS: I do not know as I could give you very much information on that point, that you have not already learned in the various dairymen's meetings.

THE PRESIDENT: That would not account for the difference in the flavor of the butter this year and last, for as far as that is concerned, it would not vary much from last year.

GOV. HOARD: It is impossible to make very fine flavored

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butter unless you have new milk to put into it. Did you detect any flavor of the stable in this butter?

MR. HARRIS: No, I do not know as I can recollect any. But I very distinctly found the flavor of ensilage, and linseed, and cotton-seed, and that has brought down the score. I have no doubt but a great deal more butter can be made on such food, but it injures the price of butter some in the Quincy market.

MR. CHEESEMAN: I should be glad to ask the gentleman who has examined this butter, how he was able to detect the ingredients that he has mentioned as lowering the price of butter, and what butter it was that was produced by ensilage-fed cows?

MR. HARRIS: I do not know as I am able to say. I cannot carry these all in my mind. I will tell you the reason why I think some of this butter was produced from ensilage. It was my fortune to examine butter at St. Johnsbury, and also at Burlington, where we had large exhibits, and where I had to score the different points awarded. I asked the producers of some of the butter, if they fed ensilage, and they said they did. I judged by its having the acid taste.

GOV. HOARD: Then the flavor is aciduous from ensilage?

MR. HARRIS: Yes, sir; a sour taste.

GOV. HOARD: What flavor do you detect from linseed?

MR. HARRIS: It is hard to describe a flavor, and I do not know as I can.

THE PRESIDENT: Lack of flavor?

MR. HARRIS: No, sir; it has a distinct flavor.

THE PRESIDENT: I would like to ask the gentleman if he came across a garlic flavor?

MR. HARRIS: I am not familiar with that. I am only giving this as a result of my experience in selling butter. We have all grades of butter that pass through our hands. We handle all kinds of butter that will suit our customers. I find that our best customers do not like those flavors, and therefore I draw the conclusion that they must be injurious.

MR. CHEESEMAN: Mr. Chairman, the gentleman is ex-

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ceedingly modest; but he must know that in the matter of experience, he and those engaged with him in the Quincy market, are very much our superiors, and we are very much indebted to them for the opinions they have expressed. Before this question is allowed to drop, I want to say a word. I judge from what he has said to us, that his experience in the use of ensilage has been limited, and has been confined to the poorer kinds of ensilage. Now it is a fact that the very best butter going into the New York market and some that is selling for the highest prices is produced from cows fed with ensilage. On examining the butter this morning, I had formed judgment in my own mind, which was substantially like the report that has been given us. I found some of the first prize butter whose flavor came out very much quicker the second time than it did the first. I got the ration from a producer of some of this prize butter, and have it here in my hand. I will read it: Cotton-seed meal, 100; cob meal, 100; shorts, 200; gluten, 150, and each cow gets an average of eight pounds a day of that mixture. He said he fed about five pounds of English hay each day. I asked him, "Do you feed any succulents?" He said, "I feed forty-five pounds of ensilage a day."

A MEMBER: I understand there are two kinds of ensilage, and the kind that this farmer has, perhaps, is the kind that does not bring out the sour or acid taste.

MR. GERRISH: I want to ask a favor. I notice that people sometimes like to hear stories. We have a gentleman with us who has come a long way from home to attend this meeting. I think he might tell us a story that I remember of hearing him tell, about a little Dutchman for whom he did a certain favor when he started in to make butter. Perhaps the Governor can tell us about it.

GOV. HOARD: Mr. Chairman and gentlemen, human nature is very much alike whether it is in a Dutchman or a Yankee. The story that Mr. Gerrish heard me relate was one by which I used to illustrate the value, and the money value — the clean, clear, money value — to any man of a bet-

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ter dairy education, and I took this illustration as coming within the province of my own experience. I may say that for twenty years I have lived, moved, and had my being among my people, and I have had a good many experiences in striving to bring individual cases up to the knowledge of their own salvation, as it lies in the cow. As a consequence, I have had a good many different kinds of men to deal with. The following is an illustrative case, and it shows that, really, the plan of salvation is not so very high in the air—that it lies very close to, and almost within, man's make up, if he will only "get there."

A little German farmer, by the name of Carl Streigle, came into my office one day in Fort Atkinson, about fifteen years ago. I could see a great deal of earnestness in the man's face; a typical little sturdy Dutchman, he was. He said: "Mr. Hoart, I vant to talk mit you somdings about dis dairy pizness. I got me sixty acre farm; I got me frau; I got me six childers—I do tink somdtimes I got me too many childers; unt I got me mortgage, unt that mortgage it is the piggest von; unt I work hart into the night, unt I work as hart as I can; but I no get ahead—I no can make any money; unt I hear you speaks about the dairy pizness; unt I get me nine cows, unt they vas goot for nodings. Mine frau, she make some butter." And he went on to tell me how they took the butter to the store, and the man in the store stuck up his nose and said: "Dat butter, him do stink, unt there is everyding in it; unt I tink may be dat ist so. I don't know vat to do. Can you tell me somdings?" I looked Carl in the face, and I was touched by the simple, earnest, honest, direct way, that he was appealing for help. He said: "I can't go into dairy pizness like all dese oder fellows. I get me no money. I can't do noting." I said: "Carl, you can commence to commence, can't you?" "What vas that?" I said: "You begin, right down just where you are. If there is anything at all in this matter, it ought to be intensely practical; practical enough to take hold of anybody. You have got money enough to buy two kerosene

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barrels?" "Kerosene barrels? ach, but the storekeepers sell me dose. I can puy dose." "Well, my friend, take those two barrels, stuff them full of straw, and burn out the oil. They will make you two tanks. Then you will take five dollars' worth of lumber—you have got a good well and windmill—now, take that lumber and build a little roof for a dairyhouse, over that well. Then we will make tanks out of those two oil barrels and put them under this roof, and the windmill will keep them supplied with fresh water. Then we will go down to the tinners and have some cans made, we will set the cans with the milk in them into the tanks, and we will see what we can do. The wife, she washes, she cooks cabbage, and you smoke, right in there where you have been trying to make your butter, and all the stinks there are, get into that butter. The storekeeper is right—plainly and severely right. But you start this right down here. It will not cost you fifteen dollars. We will get a little churn and see what we can do with this." Carl went to work, and did as I told him; and then I went home with him. The wife looked very suspicious, and said to Carl, "Dat Yankee is a humpug." But Carl had some faith in me, and that led him along. I showed him how to set his milk, and then said: "As fast as you skim the milk, put the cream into another can. Put the milk, after it is strained, into these cans, and the cream into those other cans. Set them into the cool water, and let your windmill pump all the cold water into it, constantly, that it will." And so in this little simple way, leading this man along into a channel whereby the science of it should become plain to him, I got him started so far. "Now," I said, "when you have got so much cream, let me know, and I will come down and churn for you, and we will pack it, and I will try to keep every step of the way within your understanding, and then you can run it yourself." So he sent me word that he had so much cream. I went over to the factory to get a little churn, and told them I wanted it for missionary purposes. I put it into my buggy and drove down to the German's house,

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churned his butter, and showed him how he ought to churn. I took out a little twenty-pound tub and packed the butter in in it. Then he said, "Where will you sell that butter?" I said: "Carl, I am going to sell it in a butter market. Fort Atkinson is not a butter market. You must always sell your butter where there is a demand for good butter, and then there is some answer to your efforts. I will sell it in Chicago, to a commission merchant." "Gott in Himmel," he said, "I will never see dat butter again." I said: "Oh, yes, you will Carl. If you sell it to Mr. White, to whom does he sell it? It will eventually find its way into the hands of this same commission merchant, perhaps, and others will get the profit of handling it. Every man does business by trusting his neighbor. It is the man that does the smallest amount of business that trusts the least, and has the most suspicions of every other man." So I tried to give him some idea of commercial law. I made the butter, packed it, and sent it to Miller & Eldridge, in Chicago. I wrote them a letter saying: "I want you to sell this butter for just what it is worth in the butter market. It is the first fruits of righteousness of my German friend, Carl Striegle, and I want it as an object lesson. Sell the butter and send me an account of sale and a check for the amount." Butter was then selling for but fifteen cents in the home market. In two or three days back came an account of sale of that butter at twenty-six cents, I think, showing the freight, express, commission, etc., and also a check for the amount. I took this little check and account of sales in my hand, harnessed my horse, drove down to my German friend's little home, and went into the house. Carl was busy in the stable. He saw me and came into the house. "Well, Carl," I said, "the butter is sold, and here is the pay for it. Here is the amount that the butter sold for—twenty-six cents a pound." He gave a start, his eyes opened, the horizon began to look large to him, he saw the light. He caught his breath after a moment, seized the check, looked at it and then suddenly started, caught his wife, held the check up and shouted: "Lucette, Lucette! Meine Gott, dat ist no humpug!

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dat is no humpug!" From that time the man started in earnest, and his success has been phenomenal. He began at the beginning, and is an illustration of that passage which says: "Except ye become as little children, ye shall in no wise enter the kingdom of Heaven," or the kingdom of the cow, either. He was teachable, without prejudices, without inherited notions. To-day he is a very prosperous dairyman; the owner of over two hundred acres of land, I think, and seventy-five cows; and all of those children — boys and all — are working together, amassing a large fortune. Every little while I get a package of butter, and on it is inscribed: "To my good friend who showed me how."

THE PRESIDENT: Ladies and gentlemen, we have a large amount of work to accomplish to-day, and we must improve the time. The next subject on the programme is "The Pig," which was assigned to me.

THE PIG.

BY J. M. CONNOR, HOPKINTON.

I have prepared no lengthy paper on this subject and have been unable to give it such consideration as its merits demand. I shall therefore occupy but a few moments of your time. I anticipate much, as no doubt you all do, from him who is to follow me. From his practical experience he will have many things to say that will be new and interesting upon this subject.

I am aware, as no doubt all of you are, that in order to make dairying profitable, we must take into consideration everything relating to it; we must make profitable everything in the line of by-products, in order to make this industry a success. From my own experience, I am satisfied that one of the important branches, as a paying matter, is that of pork raising.

We have listened this forenoon to some statements in relation to the progress made in dairying in New Hampshire

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within the past six or eight years. But are we aware of the progress that is being made in the pork production?

Not many years have elapsed since, when you came into this market, or any of our cities during the winter months, you would see upon the sidewalks in front of meat markets, and at the freight stations, stacks of Western hogs, of all sizes and shades of color. Now it is quite a number of years since I have seen Western-dressed hogs in this market.

This is evidence that we are giving more attention to the subject nearer home, and that we are supplying the market with our home production.

I realize that as a general rule, we have not much attachment to this animal, as he is rather an offensive creature. We form attachments for the horse and cow, and become strongly attached to them; but not so with the pig. He is given a home in some by-place, some foul and filthy place out of the way, and there is very little regard paid to his welfare. But do you realize the commercial value of this little, filthy animal? Of all the farm products raised in this country, only two exceed that of our pork products—the cotton and the wheat products. The annual exportation of hog products from this country, exceeds the aggregate of the cattle, horses, mules, and sheep, fresh and canned beef, tallow and mutton, corn, and all other bread stuffs, excepting wheat and flour. New Hampshire heads the list of States, in the value per head of live hogs, in the United States. These statistics certainly surprised me, and I think will give you a good illustration of the value of our pork production.

There is no other one thing in which there has been so great a change, as in the raising of pork. I recollect, but a few years ago, you could find only a very few pigs fattened upon the farm. Occasionally, where a man kept a cow, he might keep a pig; but he was not able to go into the pork business much. He might raise pork for his home use, and that was all. The farmers as a general rule, kept them until they were twelve, eighteen, or twenty months old. In this there has been a change. More than half of our pork, at the

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present time, is sold when the pig is under ten or twelve months of age. That is a movement in the right direction. I have given this matter some thought in connection with my dairying, and I have kept account of the receipts and the cost of production, and I am satisfied that there is no animal upon the farm that is as profitable as the pig, taking all things into consideration. If any one disagrees with me in that statement, and we have time during this meeting, I should be happy to have the matter discussed. I make this further statement, that the pig, in connection with dairying, is more profitable than the cow, when you consider the labor that is involved in the care of the two animals. I am now keeping eight pigs in connection with ten or a dozen cows, and I am also raising a calf, and so far, I had rather attend to those eight pigs than that one calf. There is not so much labor in it.

What will those eight pigs be worth when they are nine months old? and what will that calf be worth when he is two or three years old? Now I want you dairymen to think about this, and utilize your by-products in raising more pork. Keep account of the expense, and remember that it is with pigs as with everything else — in order to profit the most by them, we must keep them growing. The old custom was to have a store pig or a store hog, and not commence to fatten him until he was fifteen months old, perhaps. Previous to that, he would be squealing all the time for something to eat; but the owner would give him nothing except a little swill, up to a certain time, and then commence to fatten him. What would you think of that method applied to the beef creature. We have applied it altogether too much, and we need to remember that we must force the animal right along. There is where the profit lies. Have none of this store pig business; force the animal right along until fit to kill, and then kill him — no matter what time in the year it is. Remember, too, that the young animal will lay on fat a great deal faster than the older one, and the profit is greater if killed when he is young. He gains less as he grows older. That is an important thing to bear in mind, but I have not time to enlarge upon it here. I

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want to say that I know of a great many of our leading dairymen who make but little account of pork production, although they think it is well enough to keep them as a matter of necessity. I do not look at it in that way. I have thought sometimes that it would be a good plan to keep some cows because we have hogs.

VOICE: Pretty good.

MR. CONNOR: Now I have kept account of the cost of my pigs, and I find that in those cases where I have kept an account, the pork cost me about three and one half cents a pound for the corn and everything besides the milk, selling the pigs when nine or ten months old, and at the price for which pork sells, you see that leaves a very good margin for the skimmed milk and the labor.

I do not propose to say much more upon this subject. I wanted to call your attention to the profits that could be made from our pork products, and I leave the subject to be more thoroughly ventilated by the gentleman who is to follow me, my friend, Mr. James Cheeseman, of Southborough, Mass., of the celebrated Deerfoot farm.

MR. HUMPHREY: What view would you take of the pig as a manure-making animal on your farm?

MR. CONNOR: I never gave that especial thought. In my estimate I did not consider the value of the manure, although I do regard it, of course, as of very high value, and as one of our best means for making manure.

I now have the pleasure of introducing to you Mr. James Cheeseman, who will speak to you on "Pork Products."

PORK PRODUCTS.

BY MR. JAMES CHEESEMAN, SOUTHBOROUGH, MASS.

Mr. President, Ladies and Gentlemen:

This morning, Mr. Philbrick presented a great many practical thoughts to us, in relation to the creamery business. The great thought running through the whole of his talk—

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the one that struck me the most at least — was the immense improvement during the last five years, in the quality of the butter produced. I am now reminded that there has been a great improvement in the standard of living, throughout this country; and not only here, but throughout the entire English speaking world.

Your president has told you that the first step towards success in the keeping of pigs, is a change of feeling in regard to the animal itself. If we wish to be successful in pork growing, we should no longer regard the pig as a scavenger, as is the too prevalent opinion to-day; but we should treat him with that same kindness and consideration which we give to cows.

Your president has told you, and I agree with him, that the pig is the most economical producer of fat, of any of the live stock on the farm, and it is the opposite of economical husbandry to treat him in the way we have been accustomed to do in the past. I think we have reason to believe, from what he has told us concerning the supply of your markets here in Concord, that the change of feeling towards this animal has already begun to take place.

It is much easier, now-a-days, to fat the young pig and place it upon the local markets of the New England States, than it was formerly. But in this connection I would say, do not let us deceive ourselves. We are not very much ahead of the West in this particular.

But, as I was going to add, let us not deceive ourselves with reference to Western pork. Three years ago I had occasion to write to a large Western firm, to obtain information with reference to the average age, and dressed weight of their pork products for the export market. As near as I can remember, the heaviest of them weighed only 173, or 178 pounds — somewhere below 190 pounds — dressed weight, and they were produced at a cost of from 5¼ to 5½ cents a pound. I think those statistics were for the year ending June or July, 1887, whenever their books were closed. This fact evidences the large and general treatment of pigs

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out in the West, that enables this large packing house to do the business in the export markets of the world, that it does.

Good breakfast bacon for the markets is now no longer the problem to the Chicago packing houses that it was ten, and even five years ago. A short time ago, I went into a well known house in Boston to get some lunch, and I was particularly struck with the nice bacon that was placed before me. I knew the manager, and I called him aside and inquired where he obtained his fine bacon. He replied that it came from a well known Chicago packing house, one of the four great packers in Chicago. So let us not deceive ourselves, Mr. Chairman, in regard to the quality of our pigs as compared with the Western pigs. The Westerner, it is true, is a greater distance from market, but that fact makes him keen, energetic, and always on the *qui vive* to obtain whatever advantage he may.

I want to refer for a moment or two, to the great opportunities which you have in this State for producing pork of a high quality. When Mr. Philbrick was speaking this morning, about the standing of New Hampshire butter, I was particularly struck with the fact presented with reference to the relative standing of New Hampshire and Vermont creameries. However, I must say that the very best dairy butter I have ever tasted in the New England States, was produced in Massachusetts and Vermont. The Vermonters have an advantage over you there, but certainly you have a great advantage in the matter of creamery butter. I have the greatest pleasure in bearing testimony to the quality of the butter produced at the Hillside creamery. As a matter of fact, we are paying two cents a pound more, and we do it cheerfully, for the butter produced at the Hillside creamery, than we do for butter from the other factories from which we draw our supplies.

It is very desirable, in connection with pork raising, to feed to some extent with the by-products of the dairy, but it is not well to follow that feeding too closely. Some of the directors of our experiment station have adhered very closely to the

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combination of skimmed milk and corn meal. This combination, so far as it concerns the food ratio, is a very excellent one; but the fats in that combination are too simple for the production of the highest class of pork. It does not produce as high a grade of pork as that combination which includes a little bran and middlings, with a certain amount of green food in the summer, and a moderate amount of ensilage and roots in the winter. What holds good with reference to the quality of butter, which was considered this forenoon, holds equally good with reference to the quality of pork. It is not an increased quantity that we want in these New England States, as much as it is an increase in the quality; and that principle may apply to everything that we have to do with.

Here let me revert for a moment to the question of wool and mutton. I am not a politician, in any sense of the word; and whether we should have tariff or free wool, is a question that I shall not attempt to decide. It seems to me that the wool question is very much more of an agricultural one than it is a political one. When we learn in this country to make mutton our prime product and the wool the by-product, then we shall hear very much less about free wool than at present. The question of tariff does not affect the producer of wool who is able to produce a high class of wool because he has learned to produce a high quality of mutton. The question of a high grade of goods depends entirely upon the intelligence with which the animal is fed.

I do not know what Secretary Gerrish's idea of what the character of my talk on pork products was. I expected that the chairman would have continued a little longer and tell us something more of his own practice. We, at Deerfoot farm, very politely take off our hats to your president in the matter of pig production, for I understand from your secretary that he is able to produce three litters of pigs a year, while we are not able to produce two.

MR. GERRISH: I am sorry to say that the man I had reference to is not with us to-day.

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MR. CHEESEMAN: I suppose that I am to speak from the standpoint of the butcher's block, and if I have time, to carry it further — from there into the dining-room. In speaking of this subject I shall have to refer somewhat to the way we manage at the Deerfoot farm.

What I have already said with reference to the quality of meat has an important bearing on our products. We cannot, from the nature of our business, cut up any animal which we select by accident. We have to select such animals as are most suitable for our purposes. We have to exercise the greatest care, and that is why we confine our purchases to the New England States. We purchase every year from Franklin county, Massachusetts, from nine hundred to ten hundred pigs a year. Franklin county, as many of you may be aware, is practically a dairy county. For the last few years we have taken six or eight carloads from the State of Vermont, and we have drawn some from this State. But in every State we have taken special care to select our pigs from those vicinities where dairying predominates, because that is the best guarantee for us that the pigs have been fed a fair proportion of skimmed milk. Our pigs, when cut up, are divided into the ordinary butcher cuts, such as loins and bacon stock, varying from eight to fourteen pounds per pig, according to the size of the animal. Some of the pork must be put up into fifteen or twenty-pound kegs. From some of the pig we make sausages, and we have a limited demand in some of the hotels in New York for the jowls and hams.

During the last six months we have been engaged in a very interesting experiment. This experiment has been with a view of establishing the effect of breed upon the pork product, with skimmed milk and buttermilk as the basis of food. Last spring there were four breeds that were tested — the Berkshire, Poland China, Cheshire, and Tamworth. We were to cut them up and report the relative qualities of the roasts, hams, bacon, and other products. We foresaw, after having some experience in judging of butter, that this would be a delicate task for one man, and so we obtained the privi-

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lege of having a dozen or so of ladies and gentlemen of acute taste assist us in determining the qualities of the bacon. We have at present given our decisions in regard to the bacon with this result: I think the Berkshire scored about eight votes; the Tamworth, none; and the Poland China scored only two first votes, and no second votes at all. That trial has been exceedingly instructive to me. The bacon was all treated exactly alike in the matter of curing, salting, smoking, and in every other respect. The Poland China bacon was undoubtedly the coarsest, and the two jurors who pronounced on that bacon must have got extraordinary good cuts. My wife and I voted for the Berkshire as did six others. At the second trial, made at a breakfast given by Mr. Edward Burnett, at which Governor Hoard was present, we all voted on the Berkshire. During this test, these facts came out: The Berkshire, being the fattest of all, was therefore the most delicate, because it absorbed less amount of the salt and smoke; while the Tamworth, being the leanest pig, absorbed the greatest amount of smoke and salt. For this fact I am indebted to Governor Hoard. That would show that the leaner pig could not endure the same amount of smoking and salting as the fatter and less lean pig could. So you see that experimentation of this kind is exceedingly important to the proper curing of our pork products, and also has an important bearing on pig feeding. Such results would tend to modify the practice of the butcher on the one hand, and of the feeder on the other.

Just a word or two in the matter of packages. I suppose there is no feature of the distributing business, or retail business, of the pig products, at the present day, which has received more attention than the matter of packages; and particularly is that the case within the last five years. Only a few days ago this fact was forced upon me by the receipt from New York, of a pressed box, pressed out in the same manner that tin is pressed into small vessels. This was pressed or produced from wood pulp. It was embossed on top, by machinery, with the name

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of the packer and description of its contents. This development of taste in the matter of packages has kept pace with the development of skill in feeding for the higher grade of products than we have been accustomed to in the past.

If we wish to make the most progress possible in the raising of the best class of product, it is necessary that we make the most of our opportunities — that we should make the most of the material which we may have at hand; and then we should seek the coöperation that has been described or suggested, as a valuable aid in the sale of butter. Through such a combination of farmers you can find the best markets and sell at the best prices. In this connection let me say, that while going to lunch I was forcibly impressed by the modesty of a man who has received second prize on his butter, here to-day. He told me the price for which he had sold his butter, and asked my advice with reference to the market, and matter of price. I thought it was exceedingly modest in him to send his butter to the market he did, and sell it for the price quoted by him. Here is a man who stands in need of fully appreciating the value of his own product. He has not realized for his product its full value. Those are matters which deserve serious consideration. There should be organization in the sale of farm products. It seems to me that the interest of the farmer lies in coöperation in the selling of his products, not only of butter, but also of the pork products, and thus continuing in the matter of pork what the farmer has been accustomed to do in the matter of butter.

I do not know, ladies and gentlemen, that I can occupy your time any longer with profit. If there are any questions that anyone feels disposed to ask me, I will endeavor to answer them to the best of my ability.

QUESTION: How many pounds of sausage would you get from a hog that would weigh two hundred pounds?

MR. CHEESEMAN: That is a hard question to answer. When the sausage market is brisk, and the demand for hams is relatively moderate, more goes into the sausage. We sometimes cut up hams for sausage, and sometimes the loins

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go into sausages. The amount of sausage that we would obtain from a hog is a variable quantity.

Gov. HOARD: How do you require farmers to feed the pigs that you buy of them?

MR. CHEESEMAN: The only requirement that we are able to enforce is that they shall be dairy fed. We advise and encourage the feeding of middlings and bran, during the early stages of fatting, and sometimes linseed meal. We always advise against feeding corn meal until the pig is — say five or six months old.

Gov. HOARD: Do you believe in feeding bran after that time?

MR. CHEESEMAN: No, sir, except under some circumstances where they have no milk.

MR. HUMPHREY: This question of the pig is certainly an important question for the New Hampshire farmer, and for New England, I might say. It strikes me that the farmer who does not keep pigs does not keep the right kind of stock. In my view, one of the great advantages of keeping pigs on a farm is as a manure-making animal. I believe them to be the best manure-making animals there are in existence.

Gov. HOARD: Mr. Chairman, I am very much interested in this topic. I have had some experience, and made some experiments in this line. My son and myself, own and manage two large creameries at Fort Atkinson. One four miles out, and the other in the city. The people had never given as much study to the value of skimmed milk, as they should have done; and there was prevalent among them this notion of the store hog. No doubt a very large proportion, I think it would not be too much to say seventy or eighty per cent, of the hogs killed were wintered over. Well, when we started our creameries we wanted to convince the people of the value of these by-products, and we wanted also to bring them into the understanding of how to feed skimmed milk with the largest degree of profit. That was an essential thing for us, because if they did not make money out of the creamery, we would not. So we instituted a series of exper-

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iments which cost us about three hundred dollars, but we, ourselves, derived a very considerable degree of gratifying knowledge from the matter and considered the money well expended. We took hold of these experiments and obtained some very interesting facts connected with animal physiology.

We went into a series of experiments to determine, if possible, at what age the pig will take the largest assimilation of weight for the food consumed. That is one of the most important questions for which we have to find an answer; not only in respect to the growth of pigs but of everything else. We found that there was a rising scale for the pig until he reached — say fifty pounds. Up to fifty pounds there was an increasing ratio of weight to the food consumed; but after he had reached fifty pounds he commenced going down hill, and we got a constantly decreasing ratio of weight to the food consumed. So that when we got a pig weighing 100 pounds, in order to gain one more pound, it costs 10 per cent more than it did at 50 pounds; at 150 pounds it cost 17 per cent more to make a pound of meat than it did at 50; and at 200 pounds it costs 30 per cent more; at 300 pounds, from 30 to 48 per cent more to make one pound of growth than it did at 50, it depending upon the individual characteristics of the animal. It is important for us to know the law that governs this increase of weight. Some of the food that is given the pig seems to be lost as far as the increase of weight is concerned. That is called the food of support. The pig takes his food and at once it produces an effect in two directions. First, so much of it as is necessary is appropriated for the support of the weight already acquired, and whatever is left goes to make up the weight that you want him to acquire. It reminds me of the law that sometimes governs love. It is said that there are some women, if you want to make them love you, you must fill them up with love for themselves, and what flows over belongs to you.

Supposing you have a hog weighing 299 pounds and you say, when he touches 300 I will sell him. Now you have got to feed him enough to support that 299 pounds — hold it right

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there — or he will drop back to 298, and then you will have two more pounds instead of one to add. Consequently you will have to support that live weight all the time that you are trying to increase that weight. You have been supporting the original fifty pounds right along, and also the additional weight that you have been adding from day to day; and then you say, I do not see why I cannot make any money. You are supporting more than you are producing; consequently the cost of support has taken away the profit of what you have produced. Now what is that ratio of support is a very interesting question. As near as the experiments could get it, it was about two per cent in food every day, of the live weight, supposing the pig weighed three hundred pounds. Two per cent of three hundred is six. That pig would require six pounds of food every day to support his two hundred and ninety-nine pounds. The pig appropriates that for his daily support and it requires a good deal to make any additional growth. When the pig weighs but one hundred and fifty pounds the ratio of support is smaller. The amount of food for support that you are obliged to feed is smaller in proportion to his weight. Every intelligent feeder of steers sells at twenty months, rather than at forty months; and so an intelligent feeder of pigs will sell at six, eight, or nine months, rather than at fifteen, sixteen, or eighteen months. If you make two pigs weigh four hundred pounds, there is a ratio of profit in them, but if you make one weigh four hundred pounds, there is a ratio of loss.

THE PRESIDENT: I am sure we are under great obligations to Governor Hoard for this practical talk that is right to the point on the pig question. Here is a lesson that we can apply to other things as well as the pig. I think that we have food for reflection here for some time. I will now introduce to you Mr. C. H. Waterhouse, vice-president of the association, who will speak to you upon "Milk Analysis."

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MILK ANALYSIS.

BY VICE-PRESIDENT C. H. WATERHOUSE.

Milk is of a complex composition. To the ancient as well as the modern world, it was a fluid of great virtue, and was the first form of food that received the attention of physicians. To it was ascribed valuable medicinal qualities. Ancient physicians prescribed and forbade its use in certain ailments. Only three parts were at first recognized — serum, butter, and curd. In the year 1619, milk sugar was discovered.

Milk was first observed under a microscope in the eighteenth century, and found to be a fluid containing many globules, some of which rose to the surface. In 1737, we find a record of milk testing, a report of which gives about the same amount of solids as now, thirteen per cent. Milk has been tested with a variety of systems and found to curdle with all acids. After boiling with alkali, we find it changed to a brownish color. The rapid determination of the quality of milk is of great importance, and various methods have been introduced for the purpose. There is no question of so much weight to the dairymen of to-day, as the division of profits of coöperative creameries. Unless some method is adopted, the factory system will be on the decline, especially in localities where patrons have been taught that it is for their interest to grade up. Years ago, when creameries were first started, nearly all the cows were natives, consequently, the difference in the quality of milk furnished by patrons was very much less than now, and the division of profits worked less injustice. Pooling of milk puts a bounty on fraud. The factory system must be modified so that it will be for the interest of every man to deliver pure milk from whatever breed. It would be impossible to centre the views of dairymen to one breed of cows, and as the breed and not the feed put in the quality, thus the more we need some system for determining the quality of milk. Jerseys and Guernseys put in five and one half pounds of butter to one hundred pounds of milk; Durhams, Ayrshires, and Holsteins, four pounds to one hun-

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dred pounds of milk. Then at twenty-five cents for butter, milk of former breeds would be worth $1.37 per hundred pounds; of the latter, $1.00 per hundred pounds. Partly for this reason we find so much dissatisfaction among patrons. The variation in the amount of fat in milk from month to month is surprising. How often we hear men say, "My cows ought to give good milk for I feed an abundance of grain." Experimenters tell us feed does not materially change the per cent of fat in milk. Experiments were made at Cornell University, for several years; report no marked advantage was gained by feeding grains, in per cent of fat in milk.

We not only have milk testing apparatus, but we have machines to determine the per cent of fat in butter. I am asking that butter be sold according to the amount of fat it contains; the standard to be eighty-five per cent, or whatever shall be determined at the experiment station. We hope the House will enact a law to that effect; also create the office of dairy commissioner, whose duty it shall be to visit creameries, stores, and wagons, with power to sample butter, cheese, and milk for analysis, and prosecute any violation. Said commissioner to be appointed by the governor and paid by the State. He should be law and Gospel in creameries as to the tests and amount of water sold in butter, etc.

This is a little off my subject, however, but good suggestions are in order at any time. Milk testing is the great dairy question of to-day, and the interest will increase for some time. The most advanced dairymen see in it a means of helping to find out the poor cows of the herd without the churn test. The factory man sees a means of dividing money with patrons, according to the fat contained in the milk. Watering milk will stop short off when the fat test is used. Even the dishonest dairyman will hardly be willing to draw water to the factory just for the fun of it. If the dairymen are unwilling to use it to divide money, there is still another use for it—in what it teaches in regard to skimming and churning; in fact, all the losses in the dairy. It will assist the dairyman in determining which cow of his herd to send

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to the butcher. When a man puts his hand into his pocket and finds his wallet gone, he at once goes in search of it. So with the dairyman. When he discovers a loss he immediately looks for the cause. Dairymen have been searching for a long time for an absolute system of testing milk.

Those of you who were present two years ago, at the annual meeting of the Granite State Dairymen's Association, will remember I advocated a system for testing milk in every town. There are several different kinds of apparatus, all upon the same principle. There are many kinds of mowing machines, but all upon one principle — shears cut. So with milk, any apparatus that will give the per cent of fat with the least expense and in the shortest time, is the most desirable. Some advocate the testing of milk delivered at cheese factories. We have here two systems — Professor Short's, and Dr. Babcock's. One experimenter in speaking of Professor Short's system said, "Of the one thousand samples tested by it and the gravimetric system, the difference was less than one tenth of one per cent." Then let us feel that we have here as good a test as there is. Difficulties have arisen by not having bottles properly graduated; some have been put upon the market without any graduation marks, measurements are made with a little rule. I found one creamery manager using such bottles, and the difference in the size of the bottles would make one per cent. We should be very particular to get good samples. Thoroughly stir the milk and use a dipper, take a little in a tumbler and let the samples remain until all become of the same temperature.

Well, says one, I sell my milk to the cars, what do I care about this? Sure enough what do you care? If I should tell you that you do not get any more for a pound of butter in winter than you do in summer, you would not believe me. This statement is made to those who sell for eighteen cents in summer and twenty-two and one half in winter.

Here is a test sheet from which was made our pay-roll for July, an average of four per cent: In a can of $8\frac{1}{2}$ quarts of milk, which weighs 18 pounds, you will get $\frac{72}{100}$ of a pound of butter.

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Now here is a test for November, an average of five per cent: In a can of milk you will get $\frac{20}{100}$ of a pound of butter.

Instead of $4\frac{1}{2}$ cents a can difference, there would be 7 or 8 cents a can difference in price, on the basis of analysis at the creamery.

Mr. Waterhouse then illustrated the testing of milk by the Babcock tester. Samples brought in by different members of the association were tested by the Babcock system and the results compared with the results where the same samples were tested under the Short system.

Babcock.	Short.	
5.6	5.12	
11.	10.	Guessed at in both as the scales would not register so high.
10.50	10.50	Guessed at.

Other samples were tested but were not compared.

MR. BAKER: Mr. J. G. Tallant's sample tested eleven per cent. We should like to hear from Mr. Tallant, of East Concord.

MR. TALLANT: Ladies and gentlemen, I have always been a great stickler for breed. This milk came from the Jersey cow, Little Mischief. She is now six years old and she has not been dry since she dropped her first calf. I have noticed that as the time drew near for her to calve, what milk she gave was very rich — that is, I thought it was as compared with other individual cows in the herd. She is now due to calve in about six weeks.

I was not aware that there was to be anything of this kind here, but I took samples of three different cows' milk and thought I would bring them down and show the richness. Those bottles of milk were placed in hot water as I thought it would throw up the cream better. When they were brought down here this morning, it was discovered that they were going to have this testing apparatus here so this sample was put in.

QUESTION: How much milk does that cow give?

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MR. TALLANT: She is giving now two or three quarts a day.

MR. BAKER: Ten and five tenths per cent. That sample was brought in by me and I suppose that I have to do the same as Mr. Tallant has done. I am not such a stickler for breed, perhaps, as Mr. Tallant is. The cow from which this sample is taken is a cross between the Holstein and Jersey. She calved the seventeenth of last July and she is now giving between seven and ten quarts of milk a day. She made last year four hundred pounds of butter.

QUESTION: How many pounds of milk did she give to make the four hundred pounds of butter?

MR. BAKER: I cannot tell. I weighed the milk but I have not the data with me. I cannot give the figures here.

Another sample that I brought has tested 5.4 per cent. That was a sample from another cow. She was a grade.

QUESTION: What grade was she?

MR. BAKER: Perhaps I might answer that question by saying that she was one fourth Jersey, one fourth Holstein and the other half cow. There was some Jersey and some Holstein blood in her.

MR. GERRISH: I would like to ask the governor a question. Whether he considers anything a grade that has not a thoroughbred sire?

GOV. HOARD: It is proportionately a grade.

MR. GERRISH: I have sometimes refused to go into the grade class because I have not used a thoroughbred sire with my sheep for about twelve years.

GOV. HOARD: I do not think it is a profitable way to grade. I think that a person should use a thoroughbred on one side or the other.

MR. BAKER: In three of the samples brought in by Mr. Connor there is very little variation. They run 5.6, 5.6, and 5.1 per cent. He also brought a sample which tested 8.2 per cent.

MR. CONNOR: The sample that tested eight per cent and a little over, I imagine is from a Guernsey that has been in milk

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over a year — a year and a half, perhaps. She is giving about six quarts of milk a day. I regard her as one of my best cows.

MR. CHEESEMAN: Is she in calf?

MR. CONNOR: No, she is not. One of the other three samples is a sample of the average herd. I took a certain portion of the milk of each cow in the herd and stirred it up and got my sample from that. The other two samples are from two cows, one of which calved two months ago and the other four or five months ago. They represent about the average herd, it seems.

GOV. HOARD: This sample work is a good thing, and I believe that the use of these tests is going to have great practical results. In our creamery we took twelve thousand tests last year. We are constantly at it. We test our skimmed milk and butter milk, and we are constantly proving our work to know if the machinery is working properly or whether we are losing butter.

Then this butter is owned by our patrons, and we want to divide that butter upon a test basis to those men. We have a novel way of getting at it. We are all pooling our milk. So we have what we call a Jersey vat, a vat into which is put all the milk from cows that have fifty per cent of Jersey and Guernsey blood. I have discovered that breed has a good deal to do with the butter fat that is in the milk, and we also have other vats in which we put all the other milk in that same way. So we try to have every kind of milk pooled together according to the amount of butter fat in it. Consequently, those men that have the poor cows are getting distanced. When they were getting their profits out of their neighbors they were the most contented lot of fellows I ever saw. This little test business is the thing that is opening men's eyes.

We take four per cent of fat and establish that as a basis for the standard test. To the man that brings milk that has only three per cent of fat in it we say, you shall not have a dividend equal to four per cent. On the other hand we try to see that justice is done the man that brings milk with more than

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four per cent of fat in it. So we are trying to do this business on business principles, and this little test is helping us out.

I want to give you a couple of illustrations of these patrons of ours. At the head of the list stands a man by the name of McPherson, to whom last year I paid sixty-five dollars a head for the products of his herd. At the foot of the list is another man whose name I need not give, to whom I paid thirty-five dollars a head for the earnings of his herd of twenty cows. The same sky above him, the same earth beneath his feet, the same market in front of him, and the same creamery behind him. It beat everything how this thirty-five dollar man was cursing the tariff and everything else. He was out of sorts with everything. The first man has a herd of cows which are Jerseys, I think. This herd gives, upon an average, about six thousand pounds of milk apiece while the other man gets about three thousand. He says that a cow is a cow, and it don't make much difference where you get her or where she comes from — she is a cow. We can do but very little with that man. We paid him thirty-five dollars for each cow. What did it cost him. It cost that man thirty dollars a head to keep his cows. It is impossible to keep a cow as we keep them in Wisconsin short of thirty dollars apiece. That gave him a margin of five dollars for his labor. Mr. McPherson's cows give him a margin of thirty-five dollars. One man gets seven hundred per cent more than the other. It is just that little difference between the man of brains, the man who is an honor to the name of dairyman, and this other man who represents the average man, or below the average man. I heard Mr. McPherson utter an important truth which every dairyman in the country can take to himself. He said, "I will be blamed if I will be an average man. There isn't any money in being an average man." Put it right there in everything. Never be an average man. You will often hear men say, I want to know how much it is worth on the average. The whole glory or satisfaction in life is to be more than an average man, more than an average dairy-

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man, having more than an average cow, and being thorough in everything. At the same time you get pay for being above the average.

MR. CHEESEMAN: I want to say one word, Mr. President, with reference to this apparatus for testing milk. We have tested it right along with the gravimetric system, and I can pay it a very high compliment.

Something was said this morning by Mr. Philbrick about employing too cheap help. When the governor visited us about two months ago, he said that he paid his head man twelve hundred dollars a year. I do not know of any creamery in the New England States, running either on the proprietary or coöperative method, that pays as high a salary as that. Some of them pay a thousand a year.

GOV. HOARD: He is worth it because he has brains, knowledge, and skill. We keep a man to run the separators only, and find that it pays to do that. I want to add another word in regard to this question of skill. Take the average farmer, and it does not often occur to him that his financial salvation depends upon how much skill he sells. It is just as true with him as with that man in the factory, it is the skill that commands the large price. I was coming down a river once on the north shore of Lake Superior. I was in a bark canoe with a couple of Indians. We ran down the river at the rate of twenty-eight miles an hour, dashing down some of the most terrible rapids you ever saw. Coming down one of these I looked ahead, and there was a great rock that loomed up before us. I knew that I was gone. The canoe would surely strike that rock and there was no chance for life in that boiling, surging current. The birch bark canoe seemed to rush right on to the rock, when, just as it struck the reflex action of the water against the rock, the Indians took advantage of that, turned the canoe, and we passed by, but it seemed to me a hairbreadth escape. This experience was repeated constantly for twenty-five or thirty miles. What was there between me and death? It was not the thickness of the canoe, for it was but a thin shell; it was not muscle, but it

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was skill. It seems to me that if we could only get our agricultural population, our dairy farmers, to realize that it is the skillful labor that is the most remunerative and the most in demand, we would make a great advance.

Within the last ten years a large amount of intellect has been expended right on this problem of making butter and of breeding cattle. We are trying to eliminate this fog that has surrounded us for so long, and wherein we have worked for generation after generation to so little purpose. Perhaps the farmer has the right to complain that he gets so little for his labor; but I do believe, that if we would turn his attention towards himself rather than towards the stars, there would be a greater advance in our methods and our results.

Evening Session.

The meeting was opened by the president, and Ex-Governor Hoard of Fort Atkinson, Wis., was introduced by Governor Tuttle as follows:

The gathering here this evening shows an increased interest in that which concerns the industries of our State so much. I congratulate you, gentlemen and ladies, in securing the services of the honorable gentleman who will speak to you this evening, and I am pleased to introduce to you Ex-Governor Hoard of Wisconsin.

DAIRY TEMPERAMENT OF THE COW.

(ILLUSTRATED.)

EX-GOVERNOR W. D. HOARD, OF WISCONSIN.

Ladies and Gentlemen, — I need not say to you that it affords me great satisfaction to be the bearer of a message to you somewhat different in character from those with which I have had officially to deal for the past two years. I am out of my jurisdiction, as far as my official relations are concerned; thanks to the universality of the cow, not out of her jurisdiction.

I am to talk to you to-night upon a question, which, in my

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judgment, is one of the most important affecting our understanding of dairying. The proverb says, "As a man thinketh so is he." I have been very much dissatisfied with the standards of thinking concerning the dairy cow. The dairy interest of the United States has been tentative to a very large extent, has been struggling alone to its present shape. I understand that man's wrong judgment of the animal upon which the dairy interest is dependent, has been very largely the reason of the lack of success, and these judgments have been very much the creatures of notions and not of the understanding. The average farmer of the United States must, in the nature of things, become the breeder of the dairy cow. Yet but a very few men, to-day, are scientifically engaged in the production of dairy cattle. Success and prosperity to our people is guaged by the knowledge of what the average farmer knows of this animal which is so important to his welfare. As a consequence, it seems to me that there ought to be a decided, earnest, and conscientious study devoted to the interests of this animal.

If you have noticed, you will find that almost every other breeder of our domestic animals is clear and clean cut in his understanding. The horse man shows clear and clean cut ideas and understanding as to the horse; the man who breeds dogs has clear and clean cut ideas as to the dog; the man who breeds chickens has clear and clean cut ideas as to the chicken; and the man who breeds sheep, the same as to the sheep. It would be a ridiculous proposition to make to the merino-sheep man in the State of Vermont or New Hampshire, to say to him that for the sake of improving the fineness of the wool he ought to cross that merino with the Cotswold; or to the trotting-horse man, in order to improve the speed and trotting qualities of his Hambletonian he ought to cross it with the English Shire or Clydesdale; and so the game-chicken man would look at you with unfeigned astonishment, if you should suggest to him that to improve the fighting and staying qualities of his game chicken he had better cross him with the white Brahma. So you see that in every thing con-

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cerning all of our domestic animals except this animal, the cow, the average man has a specific manner of breeding and handling which follows in the line of their judgments; but the moment you come to the dairy cow, that very moment everybody is mixed in his notions. That is why I have so often found myself diametrically opposed to the general idea.

I would say that I have been engaged in the study of this question for over thirty years; have been quietly and patiently at work striving to build up a judgment and discernment that should be just and true to the facts in the case and the physiological law that underlies this animal.

I find that there is just as specifically a dairy temperament in cattle as a speed temperament in horses, a fighting temperament in chickens, or a scent temperament in dogs, which may be made or considerably altered by some of these outside ideas. Let us start to-night, my friends, from what is known as the dairy temperament. The question may be asked, what is the dairy temperament? What is meant by it? All men and all animals are temperamentally constructed. Your speaker stands before you, for instance, known physiologically as a man of a nervous, bilious temperament. Another man may be known as being of a phlegmatic temperament, and another of a specifically nervous temperament. Now this distinction of temperament creates a distinction of form, and form creates a distinction of function. This is a very interesting physiological fact, yet your own observation will show you that it is true. Show me anywhere a man who is engaged in decidedly nervous work, work which is calling constantly upon the nervous machinery and not upon the muscular, and I will show you a man who has a corresponding constitution of body and form. Temperament decides the peculiar work we shall engage in. For instance, did you ever see in your life a very deft and swift seamstress, one expert with her needle, who had a very short, thick, puggy finger, and a short, thick neck? No, or rarely ever. It is almost universally the lean, nervous-built, quick-motioned woman, with thin fingers, deft in her touch. She belongs to

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a temperament that decides her avocations and her functions. Did you ever in your life see a man who was a skillful violin player, who had such short, thick-built fingers? If you did, you have seen a man playing at it, but you never saw a man with such fingers who was master of the art. I have studied hundreds, and I might say thousands, of such men, and I have seen universally that the avocations and functions follow the temperament of men. This is just a little talk upon the effect of temperament in deciding the avocation or function. Let me say that it also establishes form. Now intelligent horsemen study the form of the horse, because they know that the form of the horse determines function very largely, and function determines form — both are active and retro-active in their effect. For instance, the shoulder of the trotting horse pitches back in this way, which is for the purpose of allowing the forward legs an easy and free motion out in this way. The draught horse has a shoulder more nearly vertical, in order that the collar may form a larger and more close compact with the shoulder, and a loss in the freedom of motion results. The trotting horse has a more raised spine. Turn it right over, and there is the draught horse spine. The shape of the spine of the trotting horse gives the hind portion more spring, and brings about the perfectness of its motion. The whole is mechanical in its action. Now there was an old Arabian, two thousand years ago, who said, "Form is everything to purpose." And yet, I find plenty of men to-day that pay but little attention to it. Form, I have said, was everything to purpose. It is so in the mechanical world. The action of the horse is a mechanical motion, and the action of a cow is mechanical. She is a machine. A sewing machine is made different from a spinning machine, and a mowing machine from a threshing machine, and so everything is varied along the line of function.

This is a question of temperament with the dairy cow. The dairy quality is based upon what is known as the nervous temperament. Let me say here that, specifically, speed in horses, scent in dogs, and dairy qualities in cows are practi-

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cally based upon the nervous temperament, and there is no animal in any one of these three classes that shows decided nerve and ability in the exercise of its particular function, but what draws more upon the nervous temperament than any other.

Now we are engaged in a study to find out some reasons, if possible some causes, that make this animal what she is; and our practical purpose is to use what conclusions we may arrive at in the practical work of her production, her breeding, her handling, and her feeding.

Breeding is based upon heredity. Of all other men on earth, the breeder is, in the best sense, God's vicegerent here on earth. He is the one to whom vicegerency is conveyed and to whom is given the foresight, authority, and power to shape life to the common good. As a god, knowing good from evil, he is dealing with the most profound of mysteries, that of life. This power I have said is based on heredity. It is by the establishment of this principle that power and purpose may be transmitted to posterity. There arises at once in that view of the question, the idea of potency. The thoroughbred animal is potent, while the unthoroughbred is largely non-potent in the conveying of this power. Let me illustrate what I mean by this potency by calling to mind two streams. Here is a stream that comes down by the border of Wisconsin and the States of Illinois and Iowa. It is a beautiful clear stream, taking almost a southerly direction. It is the Mississippi. But away from the northwest comes the Missouri, turbulent and muddy, but powerful in its current. It strikes the clear waters of the Mississippi almost at right angles, and thence the "Father of Waters" flows contaminated to the Gulf of Mexico. That fitly illustrates the question of potency as we find it in breeding. Here is a thoroughbred current that comes down through a long series of years and is stored full of potency unbroken in its reinforcements, it may be for a hundred years, a thousand years. Those cattle in Holland have been bred for a thousand years for a purpose. Here comes that current, and here comes

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another current that has been kept pure throughout, kept in line with its purposes. It mixes with the other current, and by its force and potency, establishes itself from that time on. In humans this principle is seen only in one race clearly, and that is the Jew. He has maintained a pure and unbroken line of blood. He is the most wonderful inbred animal there is to-day on earth, inbred to that extent by the means of relating lines of blood being thrown together, and that produces intensity of type. Inbreeding is safe, providing it is used with understanding and care, if used with a knowledge of what it will do. But many men that have never studied it have a prejudice against it. Let me say to you that every type of dogs, cattle, or horses to-day has been made so by the intensifying power of inbreeding. The Jew, as I have already said, is the most powerful inbred animal on earth. Let his current of life unite even with that of the negro and the product is a Jew all over. Let me show you a fact to illustrate to you how the principle of relating currents of life was used. Moses was the son of his father's aunt. Commence at the foundation stock. We have Abraham, Isaac, Jacob, Levi, Kobath, Amram, and Amram is the father. Start back on the mother's side, and we have Abraham, Isaac, Jacob, Levi, Jochebed, and Jochebed is the mother, the daughter of Levi, while Amram, the father, was the grandson of Levi. I am not here to discuss the moral side of this question. You can take care of that. I will trust any New Hampshire man to handle the moral side of anything. I am busy with the physiological fact that this line of management, the same that is used to-day in the production of these wonderful animals, has produced the most intense and powerful type of humanity known to-day among men. Inbreeding equals intensifying. But I do not wish to be misunderstood. Inbreeding is like a razor. It will cut your throat or cut your beard with equal willingness, depending upon how you hold it. I allude to this question to show you the possibilities of breeding upon heredities. Take the type of heredity as shown in dogs. Take, for instance, the fox hound. I have

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bred both the fox hound and the setter dog. The fox hound has a sharp nose with a most marvelous filamentary sense, whereby he distinguishes the scent of an animal. I have known him to take a track twenty-four hours old and follow it, when it seemed as if there were no earthly means whereby he could tell the story. He has been bred in a line during eight hundred or a thousand years, for a certain specific purpose. He has been bred for the one single purpose of tracking the fox. He will cross a hundred bird tracks, while ranging over the field, and he will never know it. It is on account of no lack of scent, but it is because he has been bred for another purpose. But the moment he comes to the track of a fox, he will lift up his head, and say in his own fashion, "Eureka, Eureka, I have found it!" Found what, Mr. Fox-hound? That for which I was bred — a fox track. On the other hand, you will see the bird dog, whose nose is just as sharp and whose scent is just as keen, range across a hundred fox or rabbit tracks, and pay no attention to them. He knows nothing of it. The powerful effect of his heredity is at work in him, holding him to his purpose. But the moment he touches the track of the prairie chicken or quail, or anything of that character, that very moment you will see him stiffen suddenly right in his tracks. What is the reason of that? The thousand years of breeding is answered in that posture. Do you know of a boy in New Hampshire who would be foolish enough to go out to hunt foxes with a bird dog, or birds with a fox hound, or for either with a bull dog? No, you cannot find them. But, unfortunately, his daddy may be found hunting for butter with a beef animal, forgetting that this distinct line of heredity is just as distinct for his purpose as it is for the hunter in the field with his dog. It is our duty, I think, as intelligent men, to pay attention to the lines of specific purpose and get specific benefit. The mystery is, that the dairymen of New Hampshire, of Wisconsin, and of the United States everywhere, have been raising the constant cry,— We want a cow for general purpose. General purpose! It is almost as destructive to the prosperity of the farm as

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general disability was to the army during the war. If you, as dairymen, have a cow good for general purposes, I would advise you to kill, sell, or give her away. To-day, with the sharp competition that we have to meet, we must have animals of a specific purpose, and those men who are taking that position are "wise unto their own salvation."

Now I wish you to note these three breeds (pointing to the chart). These are three dairy cows. Here is the Guernsey cow, "Select," a type of her class, one of the Channel Island cattle, distinctly bred for nearly two hundred years for the depositing of butter fat in her milk. A clear, distinct purpose has marked these simple islanders, and they have kept her blood pure. Here is the Holstein cow, "Tritomia," a type of her class. They are bred in Holland. Here is the Jersey cow, "Matilda, 4th," which in one year made her weight in butter. Here is a Hereford, a type of her class. You will see in those three dairy cattle a wonderful agreement in outline, shape, and construction, all three agreeing very closely in the character of their outline and build. They belong to the dairy temperament distinctly. That cow and this (indicating the Jersey and the Guernsey) belong to the butter division of the dairy temperament. There are two divisions of the dairy temperament. That cow and this belong to the butter division of the dairy temperament; and this cow (the Holstein) belongs more especially to the milk division of the dairy temperament as a breed. Yet this particular individual is a fine butter cow. This cow (the Hereford) has a beef temperament in her blood. Let me say to you that the judgment of many as to what constitutes a good dairy cow has been badly corrupted. You will often hear a man say, "I want a dairy cow straight on the back." No good dairy cow should be built straight on the back. It is a beef line and for beef purposes only. You note this cow (the Hereford). You see her heavy thick neck, her broad projecting bosom or brisket, her heavy shoulder, straight back, and heavy loin. You see the level hip. You see the deep flank running down here. You see all of these outward

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indications that, in accordance with her purpose, nature has established a temperament here and has lived up to it. But there is no dairy in that cow; there is no milk in her. Indeed, many of them have so little that they are hardly able to support their young. This temperament can be carried so far, my friends, as to interfere with the powers of maternity. Now this cow (the Hereford) is a miser. The beef temperament is miserly in its make-up. She stores up whatever food you give her, and gives you nothing in return, until she is laid upon the butcher's block. She is an artificial creature, like these others, for the modern cattle are all artificial, and they all have a temperament adapted to a certain purpose, unless it is the Texas cattle. The Texas cow does not belong to the dairy temperament, nor to the beef temperament. I do not know to what temperament she does belong, unless it is to the speed temperament. I remember of being chased miles by two hundred of them. I was well mounted on my good horse, and led the most remarkable charge that was made in Texas, at least, during the war; and if a man is to be judged by his following, I was as popular a man as was ever seen in Texas.

The different temperaments are to be studied from totally different standpoints. These animals (the dairy) are to be handled from totally different standpoints from that (the Hereford). The theory of handling is different, the theory of feeding is different, and the theory of breeding is different. Consequently we start from temperament, and travel divers roads. It is our business to learn the physiological laws that govern the one, if we are to deal with that class, or the physiological laws that govern the other, if we are to deal with that class.

Now the dairy temperament is essentially based upon the nervous temperament. You see how this animal (the Hereford) looks. She belongs to the phlegmatic temperament. This cow (indicating) belongs to the nervous temperament. This cow is a mother, that a miser. This cow takes food and gives off nearly all of her energy every day. She is based

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upon the essentially nervous temperament, an indication of which you see here in the peculiar outline of her head. And note the pose of her head. The race-horse expression is in her; the draught-horse expression is in that one over there. This cow is a mother upon the largest exercise of maternity known on earth. She belongs to her young. Maternity is her cry. Maternity, maternity, from morn to night, and you, as wise men, make merchandise of her maternity, and if you are wise, you make wise merchandise of it, you handle, feed, and breed for the enhancement and enlargement of her maternal powers. All that is based, not upon the muscular and osseous, but upon the power and strength of her nervous system. Let me show to you how conclusively that is true. Take the reflex action of the disease, milk-fever, the same as what is known in the human mother as puerperal fever. What channel does that fever follow? Here is the mammillary gland, the most wonderful piece of machinery I have ever studied. Look at it. Lay it under the microscope and examine it. Here is enacted that wonderful mystery, the production of milk, which, like the blood — because milk is produced from the blood — contains the mystery of life. This wonderful organization is surrounded by a network of nerves, called the sympathetic plexus, which run from here to the uterus, from the uterus to the lumbar region of the spine, and then from the spine to the brain. There is a chill, some disturbance or derangement, when the whole system is drawn clear out in its maternal functions — a draught of cold weather or something — something has been done by which the disease starts here in the uterus, attacks these nerves and the telegram immediately goes to the udder, and also to the brain, and the cow acts as though some danger were pending, she knows not what. It follows the sympathetic plexus, proceeding right along this channel of nervous communication with the spine, and immediately paralysis of the hind parts ensues, and what in England is called "dropping" follows, The disease keeps on involving more and more, until finally, she brings her head around to her side and dies, the

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victim of her maternity, and, in thousands of instances, of man's inhumanity and stupidity. The great trouble with hundreds of us is, that we never have studied motherhood, and we never have studied the meaning of maternity. I never address an audience and look into the faces of the mothers in it, but what I feel myself understood. But I too often look into the faces of men who have never given it a moment's thought. It is only when we have reached a broader understanding of God's creatures, and our relations thereto, that we will ever know something of the laws that govern and underlie this work.

In the selection of the dairy cow, let me state here, the first thing that a man should look at is the head. The first thing should be a good nostril. The dairy cow obtains the milk from her blood, and she obtains the pure blood largely from the action of her lungs. She must be a large breather; she must have the machinery to meet that demand, and therefore she must have a good nostril; also a wide muzzle and a strong muscular jaw. She is a large consumer of food, and therefore she must be built in harmony with that condition. The muscular jaw must furnish the power to grind the food. Above everything else, look for a large, full, bright eye. That is always found in connection with good nervous power. The fulness of that eye makes a dish in the face. That is not caused by a depression of the jaw bone, but by the fullness of the eye. A good cow should have good length from the eye to the horn. That indicates somewhat the size of the brain, for here is where the great nervous energy starts, and the cow, you know, is constantly making drafts on her nervous strength. The cow that makes a pound of butter a day, in making that together with the caseine which is almost pure proteine, is making a more severe draft on her nervous forces than the horse that helps to plow two acres a day. So, naturally, you find her slow of motion, inclined to rest, desirous of warmth, never engaged in a very strenuous effort for exercise unless you compel her to range for her food, and then she takes it out of you by not giving you back as much milk.

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We should provide these benefactors with all the comforts possible and not compel them to range in the way I have lately seen them between here and my native State. This is a matter of motherhood entirely. The rules of maternity are all in her as in any other mother, and so we want the region of the brain strong and full. I judge a cow from physical points and I want a reason to underlie every idea. The reason for that is that I want to see this nervous action very full and strong. For the same reason, I want a cow to show a long tail and that the end of the spinal column should reach beyond her, for we want the spinous process long and full. The next thing is the backbone. Here the same law of nervous temperament comes in. This is the channel of nervous connection between with the brain. It is a great battery along down here, from which branch out in various directions the ganglia with grey matter just like the spine. It is a good sign to see a cow with a strong back and large processes of the bones, as these processes are indicative of strength of the spinal formation. When Professor Roberts, of Canada, heard me make this assertion, he said, "I could not see any reason why you placed so much stress upon the backbone, and consequently I felt as though it was empirical somewhat, but when I went to Denmark to pursue physiological studies there, I was forcibly struck with the large size of the spinal processes." He asked me afterwards, "Had you made a special study of it?" I said, "I have followed many a noble cow to the butcher's block." I had followed her characteristics clear through to the last study that I could make of her.

The dairy cow should show a sharp shoulder, because that is in conformity with the nervous temperament and its build. The low mutton shoulder indicates a predominance of the beef temperament, but the sharp shoulder is a quality of the dairy cow. You will see that in this cow the shoulder rises half an inch. Let me tell you a story of this cow. She was owned by a man in Iowa City, and she was one of forty-eight cows that I was called upon to judge at the Minnesota State Fair. When I came to this cow I was struck by her power,

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and said to myself, that is the ideal cow. At that fair forty-eight of the finest cows in Minnesota and Iowa were brought together. I gave her the first premium, and I found at once that there was considerable kicking about it. They asked me, "Why did you give that bony cow the first premium? She is not handsome at all." I said, "Gentlemen, I am not here to bandy words. This cow is in the dairy test, and the result of that test will be declared two days from now. If you will be patient I will base my judgment of this case on the way she comes out of that test." Well, we waited, and, fortunately for me, she walked away with the first premium, having made the most butter in twenty-four hours. Then the men came to me, and asked me what I saw in the cow that led me to award the prize as I did. I explained to them that I judged the cow on this theory that I have just been giving you. Look at this cow. See the relaxed build which indicates maternity in the extreme. See the spinal column which rises bold and full. I have given you the reason for wanting that. It is because I want an indication of large nervous force in the cow, because she is called upon for the exercise of her nervous forces. Milk is full of nervous power, and you get it from nerve supporting food. The cow consumes largely albuminoids, and albuminoids are of the nerve supporting foods, and the combined effects of these two things produce a food which is the most nerve supporting food on earth — that is, milk. A celebrated physician in Montreal told me that there was no treatment, after any kind of nervous depression, that was better than the giving of rich milk, and he said, "I am wonderfully struck with the effect of it upon the nervous system. In this cow (the Holstein) here is the relaxed expression of the form, and especially you will notice how the hollows here are shown, you will notice also the light, thin chine at the loins; you will notice here that there is a relaxed expression of the body. Let me say that maternity cannot be carried on so successfully with any such compact and close build as that of the Hereford here.

We come now to the pelvic arch. Here are three famous

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cows of three breeds. See this rise here. Where is your straight back? Where is this line that has come to us from the short-horn? This Holstein is individually a first-class dairy cow. Look at the form and shape of this animal. Here is the pelvic arch. See how it rises. What is that for? The effect of it is to enable her to carry on the offices of motherhood more perfectly. You see the insloping ham. The other shows a projecting ham. If it were possible to put your hand down here by the hips, you would find the muscles lying together like my two hands. If you run your hand down here, in the good dairy cow, you could almost thrust your fingers in between these two muscles to the depth of half an inch. These muscles lie apart, and not in a close condition like that of the further cow (the Hereford). The physical condition and make-up show the function of the cow. It is a wise man who studies these distinctions and understands what they mean.

Here is another muscular expression of a good cow, called by some the udder gland, and by some the milk gland, but it is not a gland at all, and has nothing to do with the milk function of a cow, except that it is generally seen in connection with good cows. It is something like a pencil. Put your hand over it, and you will feel it roll from under your fingers like a pencil. It is sharp, clear, and distinct, and it indicates a favoring condition of the muscular system; it shows that the cow is in accord with her temperament.

Here is the great mammillary gland. We should consider the construction of the udder as a part of her machinery. A good udder should rise well behind and project well forward upon the abdomen. Lay a line like that right across. A good judge of the cow watches that with a good deal of interest. You have there the line of absorption. The length of that line will indicate to you the power of the udder over the cow, and the shortness of it the power of the cow over the udder. I want the udder, as a rule, to compel the cow to carry on this work of secretion.

I want to speak a moment upon the question of constitu-

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tion. You will hear a great many men say, "I want a hardy cow, one that is tough." If she was as hardy and tough a cow as I ever saw, he could not sell her to me. I do not want a tough cow, but a cow of good constitution. A good constitution is necessary in every line of human or animal effort. But what is constitution? It is vitality and endurance in the performance of specific work. It is not necessarily strength. John L. Sullivan is a man of tremendous strength, and he can stand up and give and take blows that you or I could not stand up against, and yet if you should put John L. Sullivan at an accountant's desk or compel him to do the work of a bank clerk, the bank clerk would kill John L. Sullivan as surely as Sullivan could kill the bank clerk in a fight. The constitution of the bank clerk is just as strong as that of the prize-fighter. You have to keep within the measure of each man's functions. Every cow should have a strong constitution, but it should be in the work of a cow and not in making up for your neglect and their exposure. A man who wants a cow that will range the hills of New Hampshire from nine o'clock in the morning until four in the afternoon in the snow, will need a cow that is tough. I have seen them this very winter in New York State, ranging about in the snow with the thermometer below zero, and it is no wonder that the owners of those cows wanted hardy ones. A good constitution in a man or cow is the ability and strength to perform the duties within one's functions. The functions of motherhood invariably demand warmth, and the man that takes that mother and handles her with the idea that she is a bullock does not understand the functions of motherhood. Constitution is just as essential to have in this mother to enable her to fulfill her duties as it is in the race-horse. The best sign of a good constitution I ever knew is the development of the umbilical cord or the navel. A good development of the muscles around the umbilical point is the best and clearest sign of a good constitution, of ability and power to endure in its specific line of work. A good vitality and constitution is not the sign of talent, but it is a sign of endurance in the work allotted to

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the animal. The cow that gives you two pounds of butter per day is taxing her machinery and she must have constitution and vitality to endure it. I have given you a sign of that constitution. It is difficult for me to explain it, but I will try to do so the best I can to a mixed audience. The first I knew of this was when I was an assistant to a surgeon in examining recruits for our army. I saw him throw out what seemed to be healthy and splendidly built men. I asked him why this was. He said, "The man has no constitution, no vitality. He will go down under exposure. He will go down under hardship." I said that I should think he had every indication of a strong constitution, and he replied, "Strength is not an indication of a strong constitution. Size is not an indication of it. You have been in the army long enough to know that you have seen a small man marching by the side of a large man, and the large man would go down while the small man would go on." "Constitution is something," says the doctor, "that you cannot feed into a man or train into him. It is that which must be born in him. It is that which his mother gives to him, and this is an indication of it. Here is the very channel through which the mother supports her young. If that channel is large and full and strong the indication is good that the conveying forces of vitality have been of like character. But if it is weak and is not indicative of muscular force, you may look for a weak constitution. No matter what the talent of a person may be, if there is sign of weakness here, he will be pretty apt to go down under a hard strain." I asked, "Doctor, have you ever carried this further than into human beings?" He replied, "I have carried it into horses, and find it precisely the same." I have carried this principle into the study of dogs and cattle. I have repeatedly proved it in the selection of the fox hound who will run all day and never tire. Now then, when you select a cow, you want to look carefully for this sign of a good constitution. It is not a sign of ability, but of power to endure the work. If you judge from this, you will have to study every animal according to its own make-up. The man, the

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dog, the cow, and all other classes of animals will have to be studied from their own standpoint.

I want to speak for a moment upon the question of our handling of these animals. We must breed the dairy cow from a dairy cow standpoint, according to the purposes we wish to use her for. There are four good breeds of dairy cattle which have been bred specifically for dairy purposes: they are the Ayrshire, Jersey, Guernsey, and Holstein. Let me give you an illustration of intelligent handling: The women of Holland have always cared for the cattle of Holland, and hence we get the high character of the cattle of Holland for which they are noted. It has been one mother caring for another. I know of twenty-five or thirty women in the United States who have entered into the business of breeding dairy cattle, and there has not been a failure among them. It is because they know what a mother demands that makes them so successful. Take this question of warmth—why cannot men realize that that is necessary for the mother cow. If some men in this land would consult their wives more, they would tell some things that the men ought to know. My wife, a mother that I could question, taught me more than I could learn in this world besides of the laws of motherhood, for the sake of this mother that I could not question. I tell you that this universal law of motherhood, that applies to all God's creatures, is a law that we should study if we would understand the dairy cow. I think I was the first man that brought out distinctly the idea of warm water for dairy cattle. That was twenty-five years ago. I was riding with my wife one day and she took a sudden chill. She was delicate at the time. She said, "I am so sorry I have taken this chill." I enquired of her, "why?" "Because," she said, "it will be worse for the baby." Then I began to ask her question after question. "What will you do?" She told me what she would do. The first thing was to restore her power as a mother by the use of warmth and warm drinks. You will find that every woman in the land knows about that, but not a man ever thought of it. So I

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learned this law of motherhood and I commenced to experiment.

Now, my friends, we have obtained the dairy cow by means of the understanding of the dairy functions and those of maternity. We must breed them from the same standpoint; breed for a specific purpose — as the race-horse man, the game-chicken man, or the dog man, breeds for a specific purpose — and then we shall have cattle which will answer our purposes and bring us a profit. But a word of warning. Just as you enhance these functions so do you enhance the likelihood of certain diseases. Remember, my friends, it is never a poor cow that dies with milk fever. "Death loves a shining mark."

I lost a beautiful Jersey cow last spring, one which I greatly prized. I knew she was somewhat deficient in constitution, but I always cared for her. When I went about my political business, left my gentle friend and went to dealing with political bullocks, it was the worse for me. Word came to me that my bonny Bell had calved, and I started for home. I had always been accustomed to put my cows into a stall a week before they calved, and to keep them there and care for them. I had told my son how to care for her, but he had notions of his own. She calved in the morning and they let her lie out all night. When I got home I learned that the cow was down in the lot with the calf. I said to my son, "You know better than that." He answered, "You are so fanatical; you are so full of notions." "Yes, but I never lost a cow with milk fever, my son. I have always been able to prevent it, but never could cure it." I went down into the lot and there was the little cow, and there was a beautiful calf at her side. I saw at once that she was going to die with milk fever. The calf was taken a little distance from her, and she went around and around looking for her calf. She was already smitten with the blindness that comes from milk fever. She could not see twenty feet away.

Now it is necessary for you to select your cattle for specific purposes, from a specific standpoint, and also to breed from a

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specific standpoint. You must always handle them with a knowledge of their functions, and give them the treatment that they demand. There is not a man among you that would treat a human mother except with the greatest care, and you should not allow yourselves to treat this bovine mother with other than the greatest care.

THE PRESIDENT: I think that you will all agree with me that the talk that we have heard this evening will be highly beneficial to the dairymen of New Hampshire, and to farmers in general. It will also be seen that the Dairymen's Association is spending its money well by employing such men to speak to us. I see men here representing different parts of the State, and I am sure they will carry home with them the belief that the money which was expended in bringing this gentleman here, is well spent and will redound to the good of the farmers of New Hampshire. If there are any questions that any of you would like to ask, I am sure Governor Hoard would be pleased to answer them.

MR. TENNEY: Speaking of warm water for cows. What is the cheapest and best method that you know of?

GOV. HOARD: There are so many ways. Since the idea has become prevalent a variety of inventions have sprung into use. One of the simplest ways that I know of is called the Stowell heater, which is a galvanized iron tube in a tank. That heater takes about five cents worth of soft coal to warm the water for fifty cows.

Let me say here that the effect of warm water is best seen when the cows are not so closely housed. You want to take care of your cattle. It is wrong to give cattle ice-water. Remember that flowing water in a cold time is ice-water. If you do not believe it take a thermometer and go out and test it. Forcing a cow to take a drink of that water is not profitable, and I assure you that those who are making a profit of dairying do not do business in that way. They are husbanding the resources of their cattle as they would husband their own. They are not wasting their efforts in that way; nor are they trying to warm barnyards with the warmth of the

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cattle. It is a very costly way in which to warm barnyards. I want to say a word just here, in connection with housing your cattle, keeping them in the barn in cold weather, you have to warm the barn with animal heat and that involves a danger; you cannot put stoves in there, and no barn should be constructed so that the manure will freeze. I have not had the manure in my barn freeze for years. However, we should keep the air pure, and at the same time keep the barn warm.

There is another thing that I want to speak about. That is, retain the ammonia which is thrown off by the urine. It means eight or nine dollars every year. A cow will throw off from eight to ten pounds, and a horse more. Step into the stable of a horse that has been shut up and you will see what I mean. We often waste it and then buy it back at wholesale, in the shape of fertilizers, at seventeen cents a pound. A good way and a simple one to save this, is to use land plaster in the barn. It is the most powerful absorbent of ammonia in the world. I pay $1.60 a barrel for it, and I would pay three for it rather than not have it on account of the additional value it gives me in my manure; and it also sweetens the air of my stables.

MR. HAZEN: Governor Hoard, you spoke of the nervous temperament being the reason why these three cows are better butter cows than the other one. I would ask why the Jersey and Guernsey produce more butter with the same amount of milk, than the Holstein?

GOV. HOARD: Because she is of the second division of the dairy temperament. She has not exactly the same nervous temperament.

MR. HAZEN: Is not that another reason why, at the many tests at fairs, etc., the Holstein exceeds the Jersey; and was not that question discussed in the papers at the time that this test which you have spoken of in your State, was made — that the Holstein was not as high-strung as the Jersey?

GOV. HOARD: Yes. And there is another law that comes in there. The cow is more uniform and steady, and it takes more to disturb her. Let me say to you, my friends, that I

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can almost eliminate the butter fat that is in the milk of a cow, at a stroke. As an experiment I took a Jersey cow, and after I had milked up to a certain point, had taken about half of her milk, I set that aside and, with reluctance, took a pin and gave her a sharp rake across the flank. She sprang around in the stable and became very much excited. With a good deal of trouble I finally succeeded in quieting her, and I drew the rest of her milk. After analyzing this milk I found that there was a loss of fifteen per cent in the butter fats of the last of the milk as compared with the first. You can almost eliminate the butter fat from milk by exciting the cow. Therefore, as Mr. Hazen suggests, there is no doubt that public exhibitions of a cow of the highest nervous organization have the effect of seriously disturbing her and interfering greatly with the butter fat in the milk.

MR. HAZEN: A good cow wants a strong back, does she not?

GOV. HOARD: She wants a back with a large spinal process, not a wide back. I do not know as I should make any other distinction as to the shape of the back.

QUESTION: Do you think that you can take a Jersey calf and train her into a Hereford cow?

GOV. HOARD: No. These different types have been formed by a course of breeding extending over hundreds of years, and you cannot destroy all that work in one generation. If you give me two hundred years of fair honest time, I could breed the Hereford into the Jersey. I would enhance the nervous temperament and begin to discourage the phlegmatic.

MR. HAZEN: Another point has been brought to my mind within a few days. A man said that he had some Jerseys and bred them with Holstein, and he was going to cross once more with the Holstein and then breed them back to Jerseys. What kind of cross would that be?

ANSWER: I should say that he would have rather a hash breed, because I believe that crossing makes hash. He would have no heredities, that would be all broken up completely, and it takes heredity to make a breed.

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QUESTION: Why do you assume that there is not just as much development of the nervous temperament in the Holstein as in the Jersey?

Gov. HOARD: I have not.

QUESTION: I took it that way when you answered one of Mr. Hazen's questions, you agreed with him.

Gov. HOARD: You can develop the nervous temperament to a condition of excitability, but we must not confuse that with the nervous temperament. You speak of a man of nerve and you mean a man perfectly cool and collected and one who has the power of controlling his nervous action. You speak of a man who is nervous, and we mean a man whose nerves are all unstrung. We should say, nerveless. You can bring the nervous temperament up to a degree of excitability which works to your injury. This animal has not been developed up to that degree of excitability that the Jersey has. The Stoke Pogis, for instance, is more commonly equitable and steady, and yet she is a strain of the Jersey. They are not as excitable as the Pansy or the Alphea family. The Stoke Pogis, as a type, had a wonderful constitution and yet she was inbred.

These things I cannot fully explain, but I think I see indications of the law underlying the whole theory of breeding.

MEETING AT CHESTER, MARCH 12, 1891.

An interesting and profitable meeting was held at this place. The party was met at the station by county member O. M. Tenney, who took us to his house and after dinner to the town hall. Although the roads were muddy, the afternoon meeting was fully attended. Professor Whitcher, of the Experiment Station, after opening remarks by the president, spoke intelligently for forty minutes on "dairy breeds." He gave in an interesting manner an account of experiments conducted at the station with four leading dairy breeds. He differed with many in regard to the general purpose cow, and thought there was danger of weakening the constitution in

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breeding the special purpose cow, thus defeating the object sought.

He condemned the practice of forcing any of the breeds to such enormous production for the sake of advertising, although it might be justifiable in some cases. The speaker said that dairying was the farmer's sheet-anchor, and that was why the station had selected the dairy breeds for experimentation.

He was sorry that the Guernsey had not been one of the breeds selected as a representative of the Channel Island cattle. The breeds selected were the Jersey, Ayrshire, Holstein and Short-horn.

The Jerseys made 269 pounds of butter a year. The Ayrshire made 267; the Holstein, about the same; and the Short-horn, 261 pounds. In cost of product the Ayrshires led. The Short-horns came next, followed by the Jersey, and the Holstein, which was the least economical. He said it cost adout $45 a year to keep a cow, while many did not return an income of over $30 a year, while others returned $50 and some $70 even. If a man can select six cows from a herd of nine that will yield more income than the whole nine — why keep the other three?

The majority had better select good grades and breed to a thoroughbred bull than wait until able to purchase a herd of thoroughbreds. By pursuing this course and making careful selections, great progress could be made by a farmer in ten years and a good herd be built up at small cost.

He advocated selling milk by the amount of total solids contained therein, as there was so much difference in breeds and individuals.

Some questions followed but the speaker was obliged to hasten to the train to meet an engagement in Massachusetts.

The officers of the association present all took part in the evening meeting, but the paper assigned Col. Curtis, of Manchester, was the leading feature of the session and will be given in full:

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FOODS AND FEEDING FOR MILK.

BY COL. T. D. CURTIS.

There is no subject of greater importance in agriculture than that of feeding, whether it be feeding animals or feeding plants — and plants must be fed or there is nothing on which to feed animals. Plants are fed only for growth and development; but animals may be fed for growth and development, for simply maintaining them without growth, for sustaining them at work, for laying on fat and for the production of beef and milk. This implies intelligent feeding for a specific purpose. But most feeding is unintelligent, haphazard, general-purpose feeding, without knowledge of the character of different foods, no matter what the desired purpose may be, or whether the foods given will effect the purpose. It is done as the old doctor is said to have administered medicine in cases which he did not understand. He had a big bowl into which he threw all kinds of little surplus doses of medicine, and it contained a little of everything known to materia medica. So when he encountered a case that he could not diagnose, he administered a dose from the bowl which he used as a catch-all, on the theory that there might be something in it that would fit the case. Of course his aim was to cure, though he stood quite as good a chance to kill. In the same way, most farmers feed their stock. They grow and save a variety of foods. Their desire is to sustain their animals and get the most out of them. So they dose them with all kinds of feed during the feeding season, on the theory that some of it must produce the desired result.

Foods are not only of various kinds, but are made up of various elements. It is found that these foods may, for practical purposes, be divided into two classes. Each class of food contains most of the same elements, but in greatly varying proportions. But in practice it is found that we need to look after only *two* elements. When we have these in the right proportion to each other, we need not consider the others, as they are usually present in the right proportion and amount.

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Foods containing a large proportion of one set of elements are called nitrogenous. They are also known as albuminoids and proteines, because these contain a comparatively large proportion of nitrogen — a gas very abundant in our atmosphere. But for our present purpose, in order to avoid confusing the memory, we will call this class of foods nitrogenous.

Another class of foods is known as carbonaceous. They are also known as carbo-hydrates, because they contain carbon and water; and they are known as non-nitrogenous, or without nitrogen, which is not quite true, however, but they contain a comparatively small proportion of it. They are also called foods of respiration. But we, on this occasion, will speak of them only as carbonaceous, because their leading element is carbon, which is also found in our atmosphere, but not so abundantly as nitrogen. I am trying to reduce this subject to the fewest and simplest terms, so as to avoid confusion and forgetfulness.

We clearly understand, now, I think, that we are to consider two classes of foods. One we call nitrogenous. The other we call carbonaceous. Now what are the leading characteristics of these two classes of foods? What is it that so widely distinguishes them apart?

Nitrogenous foods go to build up tissue, to make muscle and beef, to make milk, and especially cheese. Without nitrogenous foods there can be no growth, no development, no production of beef and milk. To some extent, nitrogenous foods are convertible into fat and heat, but they cannot be fed alone without great waste; and the more nitrogenous they are, the more likely the animal is to become diseased and die. They are one-sided foods and need to be united with foods that make up the other side. You may have noticed that in this world most things go by pairs. What is one blade of the shears good for without the other? What would man be without woman? One sex cannot procreate without the other. There can be no production without the positive and negative forces. Nitrogenous foods may be said to contain

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positive forces, but they are powerless for results without the negative forces.

The carbonaceous foods contain these negative forces. Animals fed on these alone finally die of starvation; but unite the carbonaceous with the nitrogenous foods and we have a complete whole. With the two, we can so balance the ration that there will be only a minimum of waste. While the nitrogenous elements mainly go to build up tissue and muscle and to produce milk, the carbonaceous foods supply heat to the system and lay on fat. They oxidize in the body, thereby generating heat, and, uniting with nitrogen, supply force, energy, motion, and general activity. It is the business of science to find out just how to combine the two — the nitrogenous and the carbonaceous elements of food — so as to promote economy and secure the best results.

Bearing in mind these two classes of foods and their characteristics, the next thing is to distinguish them and tell to which class the several foods of the farm belong. We also want to know in what proportion to combine them for feeding purposes. Here we are compelled to refer to the feed tables of Europe and this country. Those of this country are based on the German standards, and have the same mode of expression. The German daily ration for a milch cow, for every 1,000 pounds of live weight, is, of digestible material, 2.5 pounds of nitrogenous matter, 12.5 pounds of carbonaceous matter, and 0.40 pound of fat.

The feeding ratio for milk is one pound of nitrogenous matter to 5.4 pounds of carbonaceous. It must be borne in mind that only the digestible portion of any food is available; and hence, in the feed tables, an average of the digestible portions of each food is given, and every feeder must judge for himself as to whether his foods are average, or above, or below, in nutritive quality. Very much depends on the quality of the several foods used. Unless this is correctly estimated, the feeding ratio, however carefully the ration may be weighed out, is not likely to very closely approximate the correct standard.

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We will now consider a few of the leading foods under three heads: 1. Those that are classed as nitrogenous; 2. Those that are classed as carbonaceous; 3. Those that may be considered fairly well balanced. Anything below 1 : 4.5 we will consider nitrogenous; anything above 1 : 6.0 we will call carbonaceous; and all having a feed ratio between these figures we will class as balanced foods.

NITROGENOUS FOODS.

	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Japan clover	10.70	38.00	2.10	4.0
Cow pea vines	9.56	37.02	1.34	4.2
Cow pea	18.48	54.53	1.07	3.1
Soya bean	31.14	27.48	15.59	2.0
Brewers' grains, wet	4.06	9.73	1.41	3.2
Brewers' grains, dry	14.52	37.41	4.77	3.3
Malt sprouts	18.82	52.95	0.88	2.3
Cotton-seed meal	35.75	22.25	11.65	1.4
Pasture grass	2.50	9.90	0.40	4.4
Red clover, extra	10.70	37.60	2.10	4.0
Lucerne, medium	9.40	28.30	1.00	3.3
Vetch hay	9.40	32.50	1.50	3.9
Pea hay bloom	9.40	33.10	1.60	4.0
Lupine, medium	11.30	37.33	0.70	3.4
Pasture grass	2.50	9.90	0.40	4.4
Rich pasture grass	3.40	10.90	0.60	3.6
Pasture clover, young	3.60	7.40	0.60	2.5
Red clover before blossoming	2.30	7.40	0.50	3.8
White clover in blossom	2.20	7.90	0.50	4.2
Swedish clover beginning to blossom	2.10	5.80	0.40	3.2
Esparsette	2.10	8.00	0.30	4.1
Fodder pea, blossom	2.20	7.40	0.30	3.7
Green rape	2.00	4.80	0.40	2.9
Carrot leaves	2.20	7.00	0.50	3.8
Fodder beet leaves	1.20	4.00	0.20	3.7
Rutabagas	1.50	5.10	0.30	3.9
Lupine ensilage	2.40	7.00	0.30	3.2
Beet leaf ensilage	2.00	6.30	0.70	4.0

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	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Red clover ensilage	2.80	7.20	1.70	4.1
Peas	20.20	54.40	1.70	2.9
Field beans	23.00	50.20	1.40	2.3
Vetch	24.80	48.20	2.50	2.2
Lentil	21.40	51.20	2.20	2.6
Yellow lupine	34.40	41.80	4.90	1.6
Blue lupine	23.60	54.20	4.60	2.8
Cow pea, American	19.40	49.60	1.10	2.7
Serradella	19.80	47.00	7.30	3.2
Chinese oil beans	34.50	28.30	18.10	2.1
Buckwheat bran	13.50	44.00	3.90	4.1
Pea meal	20.90	55.40	2.80	3.0
Hempseed cake	20.90	17.40	5.20	1.5
Walnut cake	31.10	28.20	11.20	1.8
Sunflower cake	31.30	24.70	7.60	1.3
Pumpkin seed cake	50.00	9.70	10.30	0.7
Rape cake	25.30	23.80	7.70	1.7
Rape meal, ex.	26.50	27.20	2.40	1.3
Beechnut cake	13.50	22.20	6.60	2.8
Palmnut cake	10.00	16.10	9.50	4.9
Cotton-seed meal, dec.	33.20	17.60	8.00	1.1
Cotton-seed meal, und.	17.50	14.90	5.50	1.7
Cow's milk	3.20	5.00	3.60	4.4
Skimmed milk	3.50	5.00	0.70	1.9
Buttermilk	3.00	5.40	1.00	2.6
Linseed cake	29.04	33.09	4.53	1.5
Linseed meal, o. p.	25.85	26.52	7.08	1.6
Linseed meal, n. p.	28.25	27.95	2.80	1.3
Rye bran	12.00	48.98	1.43	4.4
Wheat bran	11.72	44.66	2.58	4.4
Gluten meal	23.30	50.92	3.85	2.5
Buckwheat middlings	23.60	29.30	5.20	1.8

All these are not only strong foods, because containing a great deal of nitrogen or being very nitrogenous, but most of them are very concentrated and should be fed only with bulky foods that are carbonaceous. Not only is a proper proportion of carbonaceous elements required, but they must be

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bulky enough to properly and comfortably distend the cow's stomach.

Let us next consider the fairly balanced foods, such as have a feeding ratio of 4.5 to 6 — that is, one part of nitrogenous elements to 4.5 and 6 parts of carbonaceous elements.

FAIRLY BALANCED FOODS.

	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Clover hay	7.82	40.25	1.49	5.6
Johnson grass	6.70	41.00	1.20	6.0
Rye fodder	1.51	8.20	0.26	5.8
Clover, green	2.70	12.78	0.44	5.0
Clover ensilage	2.20	10.98	0.65	5.7
Oat meal	11.29	50.15	5.79	5.6
Wheat middlings	11.60	48.87	2.68	4.7
Wheat shorts	10.79	44.80	2.85	4.7
Rice bran	9.97	48.66	3.61	5.7
Dried sugar meal	10.20	54.50	5.40	5.4
Oat feed	10.26	39.87	5.70	5.2
White clover hay, medium	8.10	35.90	2.00	5.0
Alsike	8.60	34.80	1.80	4.6
Serradella, dry	8.50	36.20	2.80	5.1
Red top hay, blossom	10.30	53.10	2.60	5.4
Wire grass, early blossomed	10.20	52.70	4.00	4.5
Bermuda grass hay	9.16	46.00	1.80	5.2
Quack grass	9.80	48.20	3.00	5.2
Italian rye grass, green	2.30	12.60	0.40	5.9
Red clover, blossom green	1.70	8.70	0.40	5.7
Trefoil	1.50	7.50	0.30	5.5
Serradella, green	1.90	8.90	0.70	5.6
Buckwheat, blossom green	1.50	6.60	0.40	5.1
Fodder cabbage	1.80	8.20	0.40	5.2
Turnips	1.10	6.10	0.10	5.8
Wheat grain	11.70	64.30	1.20	5.8
Millet	9.50	45.00	2.60	5.4
Cotton-seed	17.10	14.70	27.30	4.6
Coarse wheat bran	10.00	48.50	3.10	5.6
Rye bran	10.60	50.00	2.00	5.3
Pea meal bran	9.20	45.80	1.20	5.3

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	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Barley bran	11.50	43.20	3.60	4.5
Distillery refuse	1.60	5.40	0.80	4.6
Wheat meal	10.80	54.80	2.90	5.7
Barley middlings	9.60	17.00	3.20	6.0

All these articles are sufficiently balanced, as between the nitrogenous and carbonaceous elements, but some of them need to be fed with bulkier foods. We next consider the

CARBONACEOUS FOODS.

Hay.	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Meadow, medium	5.40	41.00	1.00	8.0
Meadow, good	7.40	41.70	1.30	6.1
Rye fodder	6.60	44.30	1.30	7.2
Timothy	5.80	43.40	1.40	8.1
Early meadow	6.00	42.50	2.10	7.9
Orchard grass, blossom	6.90	40.30	1.90	6.5
Sweet-scented, vernal	5.90	40.10	2.10	7.6
Blue grass, blossom	5.90	40.00	1.60	7.5
Sheep fescue	8.80	57.10	3.60	6.9
Meadow foxtail	7.80	49.60	3.20	6.7
Fowl meadow grass	7.50	49.00	2.90	6.9
Wire grass, bloom	10.20	52.70	4.00	4.5
Barnyard grass	6.70	46.40	1.80	7.2
Italian rye grass	7.10	41.50	1.40	6.3
English rye grass	5.10	35.30	0.80	7.3
Hungarian grass	6.10	41.00	0.90	7.1
Green.				
English rye grass	1.80	12.20	0.40	7.2
Timothy	2.10	16.00	0.50	8.2
Maize, German	1.00	8.40	0.20	8.9
Fodder rye	1.90	11.00	0.40	6.3
Fodder oats	1.30	8.90	0.20	7.2
Sorghum	1.60	11.90	0.30	7.4
Hungarian, blossom	1.80	11.80	0.30	7.0
Cabbage stems	0.80	11.50	0.20	15.0
Corn ensilage	0.80	8.60	0.40	12.0
Potato top ensilage	1.20	6.20	1.30	8.0

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Straws.	Nitrogenous.	Carbonaceous.	Fat.	Ratio as 1 to
Winter wheat	0.80	35.60	0.40	45.8
Winter rye	0.80	36.50	0.40	46.9
Winter barley	0.80	31.40	0.40	40.5
Summer barley	1.30	40.60	0.50	32.2
Oat	1.40	40.10	0.60	29.9
Fodder vetch	3.40	31.09	0.50	9.8
Pea	2.90	33.40	0.50	12.0
Field bean	5.00	35.20	0.50	7.3
Seed clover	4.20	28.50	1.00	7.4
Buckwheat	1.40	36.00	0.40	26.4
Corn stalks	1.10	37.00	0.30	34.4
Corn cobs	0.60	41.70	0.40	71.2
Roots, etc.				
Potatoes	2.10	21.80	0.20	10.6
Artichokes	2.00	16.80	0.20	8.7
Fodder beets	1.10	10.00	0.10	9.3
Sugar beets	1.00	16.70	0.10	17.0
Rutabagas	1.30	10.60	0.10	8.3
Carrots	1.40	12.50	0.20	9.3
Parsnips	1.60	11.20	0.20	7.3
Grains.				
Rye	9.90	65.40	1.60	7.0
Barley	8.00	58.90	1.70	7.9
Oats	9.00	43.30	4.70	6.1
Maize	8.40	60.60	4.80	8.6
Golden millet	7.20	47.00	3.10	7.5
Buckwheat	6.80	47.00	1.20	7.4
Sunflower seed	10.40	24.60	21.20	7.2
Palm seed	8.00	31.20	48.20	18.3
Acorns, fresh	2.00	30.90	1.50	18.2
Chestnuts, fresh	3.40	35.70	1.30	11.5
Apples and pears	0.30	12.90	.00	43.0
Pumpkins	0.40	7.10	0.10	18.4
Sugar beet cake	1.80	24.60	0.20	13.9
Corn bran	6.20	55.00	3.60	10.3
Corn sugar meal	3.20	19.30	1.80	7.4
Green malt sprouts	5.20	36.90	1.20	7.7
Oat bran	5.60	49.80	2.00	9.7
Condensed milk	10.20	52.90	12.90	8.8
Whey	1.00	5.10	0.60	6.6
Cream	2.70	2.90	31.80	30.5

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These foods must all be strengthened by the use in connection with them of other foods, generally, but not always, more concentrated as well as nitrogenous. The tables show the per cent of all the constituents, or the number of parts in a hundred, and the ratio column shows how the ingredients are proportioned as to their nitrogenous and carbonaceous qualities. Now the point is to so combine the different foods as to approximate a proper ration. With the extremely carbonaceous and bulky foods must be mixed enough of the concentrated and condensed nitrogenous foods to make a due balance of the two leading elements. Then if the ration is not large enough, more of the same kind may be added, or enough of the foods that are balanced, or nearly so, may be included to make up the desired amount. These can be added without disturbing the balance to any material extent. Indeed, as will be seen by the balanced table which I have given, the ration may be broadened and narrowed considerably; and this will always be done more or less by variations in the nutritive qualities of the foods, at which the common feeder can only guess. Hence, it is fortunate that this variation of the ration does no particular harm.

Professor Armsby says: "The feeding standards are not inflexible rules, to be blindly followed, but guides and indicators, which must be intelligently adapted to local and individual circumstances." And I wish to add that these standards and feeding tables are largely made up of averages, estimates, and guesses. Chemistry itself is not as exact as many may suppose, and the best chemists claim its results as only closely approximate. But were the standards, the tables, and the chemical analyses mathematically correct, the individual variations in animals, and the variations in the quality and condition of foods would afford an element of uncertainty that would call for the most careful observation and the wisest exercise of judgment on the part of the feeder. But, as guides, the standards and feed tables are of incalculable value to the feeder who desires to feed his animals as nearly as possible on a scientific and economical basis.

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Now, when we have the foods, and the feed tables, and the standards, how shall the feeder go to work to prepare a ration for his animals? Let us make up one for a milch cow weighing 1,000 pounds — a ration for the day, to be fed in two or three meals.

We want the cow to have approximately 2.5 pounds of digestible nitrogenous material, 12.5 pounds of carbonaceous material, and .4 pound of free fat to aid in the digestion of the nitrogenous matter, and this gives us a ration having a nutritive ratio of 1 : 5.4. What are our foods? We will suppose we have clover hay; we have timothy hay; we have corn or maize ensilage; we have bright oat straw. These are our coarse and bulky foods. For our grain ration, we have corn meal; we have cotton-seed meal; we have wheat bran; we have linseed meal; we have oatmeal. Here is nothing that we cannot raise on the farm, except the cotton-seed and the linseed meal, both of which we wish to use sparingly. We will try to combine these so as to use the most of those foods which we have the most of. We will take 5 pounds of clover, 10 pounds of corn ensilage, 10 pounds of oat straw, and 5 pounds of timothy — in all, 30 pounds of coarse, bulky food. To this we will add 2 pounds of corn meal, 2 pounds of oatmeal, 1 pound of cotton-seed meal, and 1 pound of linseed meal — in all, 6 pounds of grain feed. We must have in all 25 pounds of dry material — that is, dried at a temperature of 212 degrees. The ensilage contains 70 per cent of water; the other foods are only air-dried, but we think we have about the required amount. Now I have put these foods together on a mere guess, just as any one could who knows something of the character of each. I know the clover is quite nitrogenous, and the timothy moderately carbonaceous. The two will about balance each other. The ensilage is highly carbonaceous and the oat straw still more so. The coarse foods are, therefore, very bulky and very carbonaceous as a whole. Now I come to the grain. The corn meal is quite carbonaceous, but I want it to color and flavor the butter. Besides, I use a moderate amount of ensilage. If I use more, I would

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not need to put in the corn meal. The oatmeal is well balanced and concentrated strong food, good for muscle and good for milk. Cotton-seed meal is very nitrogenous and strong, as well as fatty, hardens the butter and has a constipating tendency. The linseed meal is also counted strong in nitrogen, is oily, and has a relaxing tendency, thus counteracting the opposite tendency of the cotton-seed meal, while making the butter more oily, thus again counteracting the cotton-seed.

This is all given in a general way, to show you the operations of my mind in putting the ration together. Now let us put it to the test of the standard and the digestion tables. So we will set these down, on another page, in the form of a table, the columns running up and down. We turn to the digestion table and find good clover hay has 8.5 per cent of available nitrogenous material. We multiply this by 5 and get 42.5. This we divide by 100, and find after cutting off the decimals, we have .42 or a little over 4-10 of a pound. We set this in our table, under the head of "nitrogenous," the decimal point to the left of the figure 4. We refer to the table again and find that our clover has 38.2 per cent of carbonaceous material. We multiply by 5 and get a product of 191. There is no decimal to drop here. So we divide by 100 and have 1.91 of a pound of available carbonaceous material. We place this under the head of "carbonaceous," the decimal point after the first 1 and before the 9. Now we refer for the fat. That we find is 1.7 per cent. As in the other two cases we multiply this by 5 and find we have 85 as our product. We cut off the decimals and divide by 100 and find we have only .08 of a pound of available fat. This we write under the head of "fat," in our table, the decimal point being followed by a cipher between it and the 8.

In this way, we go through the whole list of foods, multiplying the per cent of each ingredient by the number of pounds of digestible food taken, dividing by 100, and putting the quotient in its proper place in the table. Finishing it, we find it deficient in both nitrogenous and carbonaceous mate-

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rial. In other words, it is too weak. Referring back, we find wheat bran was named among the foods on hand, but omitted from the ration. We now add 2 pounds of this popular food, making 8 pounds of grain feed, and find we have a satisfactory ration of 38 pounds — water, waste, and digestible material as follows:

		Nit.	Carb.	Fat.
5	pounds clover	.40	2.01	.07
10	" ensilage	.11	1.09	.05
10	" oat straw	.14	4.01	.06
5	" timothy	.29	2.17	.07
2	" corn meal	.15	1.27	.06
2	" oatmeal	.22	1.00	.11
1	" cotton-seed meal	.36	.22	.11
1	" linseed meal	.28	.28	.03
		1.95	12.05	.56
2	pounds wheat bran	.22	.80	.05
38		2.17	12.85	.61
	Standard	2.50	12.50	.40

We now want to find what the nutritive ratio is. To do this we multiply the fat by 2½ and add the product to the column of carbonaceous material. Why? Because free fat is considered worth 2½ times more than the other carbonaceous materials, all of which have to first become converted by vital chemistry into fat before they become available. The free fat is at once available for digestive and assimilative purposes. By multiplying .61 by 2½ we get 1.25. This added to 12.85 makes the sum of 14.37. We divide this sum by the nitrogenous elements, 2.17 and it gives us the quotient of 6.62, which is the proportion of carbonaceous material to one of nitrogenous. Or, as we would say, the nutritive ratio is as 1 : 6.62, whereas, the German standard is 1 : 5.40. There is a little over 1 part more of carbonaceous material than the standard requires. We can easily change this by putting in less ensilage, straw, timothy, or corn meal, and adding more clover, cotton-seed meal or wheat bran. Or we can feed a little more freely, and let a portion of the cheap carbonaceous material go to waste. We will see the effect on the herd.

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We find our hurriedly made-up ration a little deficient in nitrogenous material; but, for a winter ration, it is probably better than the German standard would be. Anything not above 1 : 7 is considered within the limits of permissible variation. Indeed, if I remember right, Professor Whitcher once expressed the opinion that the New England dairymen would not find butter-making profitable with a ration narrower than 1 : 7. Most herds are kept on a still wider ration. Timothy hay, a favorite food, averages about 1 : 8, and often not enough of that is supplied. In summer, on pasture grass, when carbonaceous material is not so much needed to keep up the temperature of the body, the ration is much narrower — often down to 1 : 4.

Of course, it will at once be seen that the feeding ration can be easily varied. With the material contained in our supposititious ration, we could make it just as satisfactory, and perhaps more so, by taking half the number of foods and doubling the weight. I should prefer to vary it in this way, in order to vary the flavor and add to its relish.

A word in regard to the range of the ration. As a rule, I think the ration is generally figured too narrow, even for the German standard. We adhere too closely to the rations for milk, meat, and work, and certainly figure much narrower than the rations which the farmers are in the habit of feeding. We overlook the fact that for cattle at rest the ratio may be as wide as 1 : 12; and for sheep producing wool, 1 : 8 or 9; that the moderately worked ox requires a ration of only 1 : 7.5. In fact, anywhere from 1 : 7 to 1 : 12 is allowable, unless some special demand is made on the system of the animal.

How are we to know when animals are fed enough? I know of no better way to find out than to carefully watch them and feed only what they will eat up clean at once, and then give them about the same time to digest the meal that we take to digest our own. Three good meals a day, the first early and the last late, are enough; and some think that two meals, fed morning and night, are enough. Judging by myself, I think three meals a day preferable.

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I would prepare my meal ration with due care as to its materials and the fodder I had to feed with it, so as to approximate a balance of about 1 : 6, and give all the coarse fodder needed — say ensilage in the morning, straw and roughage at noon, and good hay at night. If I thought some were getting too much, I would reduce the grain ration; if not enough, I would increase the grain ration, and in this way adjust the feed to the individuality of the animal and to the work performed.

In conclusion, I have tried to make my subject clear to the understanding of my hearers. If I have failed, I have the consolation of being in company with many a better man. If I have succeeded, I have done a good work, for which I need to be rejoiced. But do not be discouraged. I am not a scientific nor even what is known as an educated man. With but few of the elements of a common country school education, I have picked up what little I know as I have worked my way through the world. You certainly can do as well, and I believe much better.

J. L. GERRISH,
Secretary.

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PATRONS OF HUSBANDRY.

OFFICERS OF THE NEW HAMPSHIRE STATE GRANGE, 1891.

CHARLES MCDANIEL, *Master*	West Springfield.
JAMES E. SHEPARD, *Overseer*	New London.
JOHN D. LYMAN, *Lecturer*	Exeter.
FRANK H. WELD, *Steward*	Cornish.
HOWARD B. HOLMAN, *Assistant Steward*	Laconia.
Rev. GEORGE W. PATTEN, *Chaplain*	Dublin.
JONATHAN M. TAYLOR, *Treasurer*	Sanbornton.
NAHUM J. BACHELDER, *Secretary*	Andover.
HENRY MOORE, *Gate Keeper*	Goffstown.
Mrs. CHARLES MCDANIEL, *Ceres*	West Springfield.
Mrs. GEORGE J. BENNETT, *Pomona*	Westmoreland.
Mrs. NAHUM J. BACHELDER, *Flora*	East Andover.
Mrs. EMRI C. HUTCHINSON, *Lady Steward*	Milford.

EXECUTIVE COMMITTEE.

CHARLES MCDANIEL, *Chairman*	Springfield.
CHARLES H. PATTEE, *Secretary*	Hanover.
NAHUM J. BACHELDER	East Andover.
LUCIEN THOMPSON	Durham.
DANIEL W. RUGG	Sullivan.

E. C. HUTCHINSON, *General Deputy* . Milford.

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SECRETARY'S REPORT.

The seventeenth annual session of the New Hampshire State Grange was held at City Hall, Manchester, December 16, 17, and 18, 1890, and was the largest and most enthusiastic meeting yet held by the organization. The meeting was called to order at 11 o'clock A. M., by Master Charles McDaniel, with the remaining officers nearly all present and at their respective stations. The first business after the ritualistic service of opening the meeting was the conferring of the fifth degree upon twenty-six members who were entitled to receive it. This was followed by the appointment of the committee on credentials, consisting of E. C. Hutchinson, Milford; H. O. Hadley, Temple; D. H. Tufts, Strafford; Mrs. E. M. Tuttle, East Andover; Mrs. D. R. Wyman, Concord. After consultation the committee submitted a report announcing the presence of all the officers and one hundred and forty-two credited delegates. There was also present a large number of members of the order from various sections of the State. After the reading of the report in detail, the grange took a recess until 1.30 o'clock P. M.

Afternoon Session.

After the formal opening of the session and the preliminary exercises attending, Master McDaniel delivered the following annual address.

ANNUAL ADDRESS.

BY CHARLES MCDANIEL.

Officers and Members of the New Hampshire State Grange, Sisters and Brothers of the Order Patrons of Husbandry:

Time in its onward march brings us together again in annual session to council for the interest of our fraternity, our homes, and our country. History informs us that it was a sacred rule among the Pythagorians, at the close of each day,

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to run thrice over the actions and affairs of the day, to ascertain wherein they had succeeded and wherein they had failed or erred. Thus they promoted their own personal welfare, happiness, and prosperity; and as they were truly a happy, prosperous people, they are worthy of our imitation.

Taking into consideration the work that is being done in our own State by our one hundred and twenty-five active working Granges, with a membership of over nine thousand, it appears to be a wise provision in our constitution and organic law, that we look carefully at the work we have done during the past year, at our successes as well as our failures, that we may plan wisely and hopefully for the future. This seventeenth annual session of our State Grange brings with it many new members as well as visitors from all parts of our Granite State. We found these also at the twenty-fourth annual session of the National Grange, that held its meetings in the Gate City of the South, Atlanta, Georgia, November 12 to 20, 1890. A copy of the journal of proceedings will soon be sent to each Subordinate Grange. Like its predecessors, it will be found to contain the results of deliberations of representatives from thirty-two States. It should be not only read, but discussed by the members of each Grange in the State. The master's address, full of thought, and a recapitulation of his year's work, demands our attention. The report of the executive committee should also be considered, as it not only gave the record of work done during the year, but submitted several recommendations which were ably discussed by the members of the National Grange, together with the amendments presented to said report.

During the past year the following amendments have been ratified by the requisite number of State Granges, and are adopted: Article 14, page 18, of the Digest, by striking out the words, "three fourths," where they occur in the third line of said article, and insert in lieu thereof the words "two thirds." Also amend Article 7 of constitution of National Grange by adding thereto "provided that the State Granges shall have the power to reduce the fees within their respective

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jurisdictions to any sum not less than one dollar for men, and fifty cents for women." If we think it will be for our interests to reduce our initiation fees, it will be necessary to amend our state by-laws.

An amendment to the constitution, proposed by the National Grange to the State Granges for ratification or rejection, reads as follows: Amend Section 1, Article 1, under the head State Grange, by inserting between the words "matron" and "provided," where they occur in the third line of said section, the following: "And such fourth degree delegates as may be found necessary to secure to each Subordinate Grange two representatives. The fourth degree members above provided, to be chosen in such manner as the respective State Granges may prescribe."

JUVENILE GRANGES.

The executive committee of the National Grange, agreeably to vote in 1889, proposed a manual for Juvenile Granges, which was adopted by the last session of the National Grange. This work is designed for Patrons' children under fourteen years of age. It is to be adopted by the State Grange whenever used.

POMONA GRANGES.

We have organized Mascoma Valley Pomona Grange, No. 7, at Lebanon, since our last state meeting, with one hundred and fifty charter members, and several additions have been made since to its membership. This Grange, like its predecessors, has done valuable work for its members, and aided the farmers in the vicinity to see the power of organization. These granges should doubtless confine their work to members who are the supporters of this branch of our order. We think we are benefiting and being benefited by holding one public session during each meeting, that our work may be seen and investigated by our brother farmers. Other agricultural and farmers' organizations have increased in members during the past year. They doubtless hoped to secure similar results to those attained by the Grange, but some were organ-

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ized for special purposes, either political, financial, or social. Our organization has stood the test of the past twenty-four years, and we have been indeed dull have we not profited by this long existence. We aim to be progressive; to keep pace with the improvements of our country; to be always ready to do whatever is apparent for the best interests of the farmer, whether social, moral, financial, or political. The political interests should be considered in the true sense of politics and not in a partisan view, for we seek the greatest good to the greatest number.

We continue to have an abiding faith in our Declaration of Purposes, written by Brother Wright, one of our country's best educators, who was with us at our National Grange meeting at Atlanta, and whose photograph, together with that of Brother Sanders, the first master of the National Grange, is before you.

EDUCATION.

Our State Experiment Station is keeping abreast with the progress of the day. Valuable work has been done during the past year. The several bulletins that have been issued and distributed among our farmers have been of untold value to those who have read them and profited thereby. We fear that too few visit the station and examine the work which is done there, and thus ascertain the points in which they should be personally interested. Valuable additions have been made to the farm buildings and machinery, as well as to the scientific department. It is a very easy matter to criticise the work of our public servants, especially when the account current is made up for the fiscal year. We must recollect that the work of the station is not to make the most dollars at the present time, but to educate in the various lines of work. This may be illustrated by the work now being done in a distant State in a special line of scientific work in which the people of that State are specially interested. We were told by the director of that experiment station that, in an average, for twenty-five dollars' worth of product the cost was one hundred dol-

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lars for production and manufacturing. Men in the same practical line of work were examining results as well as details. Let us as Patrons and farmers avail ourselves of the benefit of our Educational Agricultural Experiment Station. Your committee appointed at the last session will doubtless give you, during this meeting, the result of their investigation.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

Our College of Agriculture and Mechanic Arts is becoming more popular and useful. Our friends are now largely increased through the munificence of the national government to equip laboratories and workshops; and additions are to be made to the faculty. We are to have several new departments and among them a special veterinarian department as soon as the practical, as well as educated theoretical man can be obtained for the position. This is a long felt want, not only to have the science taught but to have a man in our Agricultural college that we can look to as authority upon the diseases of our flocks, herds, and horses — one who can tell us to a certainty whether our stock is afflicted with fever, tuberculosis, *la grippe*, or some nameless disease, and advise as to what is the proper thing to do in the way of treatment.

Our mechanical department is to be supplemented with electrical engineering and other improved work. Let us do all we can to patronize these institutions and educate the rising generation of farmers to know their work equally as well as any of the so called professions. It is only too true that to be a successful farmer, in the broad meaning of the term, he needs more knowledge, general and specific, than any professional man. It is also intended to fill the chairs of entomology and horticulture, and thus make more complete all lines of agricultural instruction.

THE THOMPSON WILL.

The "Thompson will case" will be and has been the subject of much speculation in regard to the state and agricultural college. We hope and trust that wise and prudent

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action will be taken by our Legislature-elect in regard to this valuable Thompson bequest. It does not appear that our State ought to let this valuable estate be removed from us, but accept the same. In the meantime, before said estate shall be used or available, let us do all we can to sustain, improve, and make powerful for good our present agricultural college in its present location. Let our common schools have text-books on agricultural subjects, especially upon the growth of common plants, trees, shrubs, and vines. In this way our boys and girls may be taught to investigate natural things, and realize the wondrous work of God in nature, as well as in revelation. To this we would add political economy, and the laws of business in agriculture.

Then we have this broader institution, the Grange, which is the educator of the masses of farmers, their wives, and their children. They are educated in their meetings, where essays, papers, and discussions are participated in by all, each in his own private sphere; where social, intellectual, and moral principles are inculcated, and temperance is supported. All over our broad country we find among our agricultural class more or less grumbling because their business does not pay better profits. In portions of some States the people are boasting of their soil and climate, their crops, and their natural and acquired advantages. They are truly happy, simply because they have adapted themselves to their circumstances, and having applied business principles, the results are satisfactory. Still there is agricultural depression all over the country. Our land here in New England may have been cropped more than those of the South and West, and failed to yield as big returns; but we are near our market; we have social advantages; and our skill and industry make our own agricultural location one to be proud of. Now that agriculture is recognized as one of the departments of the government, and owes that recognition, in a measure, to the Grange, we hope that the secretary of agriculture will look well to our interests. To secure our just rights we must study our political condition, consider what legislation bears directly or

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indirectly for and against us, then, united by our voice and votes, correct any improper and unjust laws. Again, we recommend to the careful consideration of the Grange the "Australian ballot system," or a similar one, or a measure intended to purify and promote the freedom of the ballot.

THE PRESS.

We recognize the power the press has exerted in promoting the welfare of our order. The change in tone of our state and local papers is noticeable. We owe a debt of gratitude to many of our papers that have so ably defended our principles. Without booming any particular publication, we suggest that in the future our order patronize as many of the local and state papers as practicable.

WOMAN'S WORK.

Woman's work in the Grange is identical with man's. She has an equal voice and vote, is eligible to each and all offices in the Grange, from the humblest in a Subordinate to the highest in the National Grange. The work she is accomplishing is above price. They inspire us with loftier and nobler purposes; their counsel and influence in our meetings are of a most salutary character. They are learning how to conduct business according to parliamentary law, and are becoming versed in the political situation of the country.

DEPUTY INSPECTION.

We believe our success in routine work has greatly improved since the system of "deputy inspection" has been adopted. The deputies have, I think, examined carefully the work, record, and financial standing, and with very few exceptions have found the laws and usages of the order faithfully executed. Irregularities have been corrected and the spirit of fraternity inculcated.

ARBOR DAY.

The Grange originated Arbor Day, to be spent in beautifying our homes, school and church grounds, streets, highways, and public parks.

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Yet the Grange adds another charm by holding meetings on the eve of the day to report the ways and means adopted, the work done, and to discuss the manner of setting and pruning different varieties of trees, plants, and shrubs.

CHILDREN'S DAY.

Children's Day is now appointed by the National Grange master, and will doubtless be fully appreciated, especially by Juvenile Granges, whenever and wherever organized. The day is generally spent in listening to readings, recitations, and songs of an interesting and instructive character, while added to the mental feast is a feast of the best edibles the home affords.

STATE GRANGE FAIR.

The State Grange Fair continues to increase in size, and quantity and quality of its exhibits, in proportion to the membership of our organization. It has come to be one of the leading events of the year, and takes a very high rank among the fairs of New England. We have reason to be proud of this branch of our Grange work. May its shadow never grow less, and may the blessings of all good Patrons fall upon our friend and benefactor, Hon. Charles E. Tilton, who continues to help, aid, and assist in this noble work.

GRANGE MUTUAL FIRE INSURANCE.

Since the organization of our Grange Mutual Fire Insurance Company, July 20, 1888, we have continued to increase our business at a very rapid rate. Nothing yet has occurred to mar the prosperity of the company. We have issued 1,121 policies on property to the value of over $1,400,000, and the rate has been only seven cents on $100 for the past year's insurance. The Patrons' Relief Association is still under the charge of an efficient corps of officers and directors. Its aims and objects are probably well understood by every member of this Grange. It is the surest and safest life insurance, for its benefits are always paid when due. The finances of our

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State Grange are in a safe and prosperous condition, as our expenses are kept within our income and we are annually laying by a surplus. A well filled treasury without an excessive surplus is always conducive to the prosperity of any organization.

IN MEMORIAM.

Memorial exercises will be held during this session, according to published order of business, this being one of our appropriately established customs. We are pained to record the following list of those who have been members of this body, but who have been called up higher to that celestial degree of the Great Grange above, presided over by that Master whose only gavel is love:

Sister Lila C. Hardy, wife of Past Master W. D. Hardy of Greenfield Grange, No. 23, died Jan. 14, 1890.

Brother Benjamin Q. Jewett, past master of Mt. Belknap Grange, No 52, died Feb. 13, 1890.

Sister Abbie C. Cogswell, wife of Past Master J. W. Cogswell of Crystal Lake Grange, No. 101, died March 30, 1890.

Sister Huldah M. Taylor, wife of Past Master J. M. Taylor of Harmony Grange, No 99, and treasurer of State Grange, died April 22, 1890.

Sister Maria Sherry, wife of Past Master Daniel Sherry of Monroe Grange, No. 49, died Aug. 13, 1890.

Sister Mary Burnap, wife of Master James Burnap of Excelsior Grange, No. 136, died Sept. 1, 1890.

Sister Phila M. Gage, wife of Past Master John Gage of Bear Hill Grange, No. 39, died Sept. 12, 1890.

Sister Mary E. Clarke, wife of Past Master M. D. Clarke of Warren Pond Grange, No. 47, died Nov. 6, 1890.

CONCLUSION.

We commit the business of the session to your hands, hoping and trusting that each and all may have an opportunity to place before this meeting any topic for discussion, any amend-

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ments to our laws, and especially to offer such suggestions as may prove valuable to us as a whole.

For the many favors and courtesies received during the past, I return many thanks. Let us continue the good work so well begun, and as the Pacific States showed marked progress during the past year, so may our New England and Atlantic States prove themselves equal to any emergency in Grange work, until the whole farming community shall know and realize the power of the Patrons of Husbandry.

Hon. J. D. Lyman, lecturer, made the following report:

REPORT OF LECTURER.

BY JOHN D. LYMAN.

Worthy Master, Sisters and Brothers of the State Grange:

What a glorious sight greets my vision! What a meeting of the representative and progressive farmers of glorious old New Hampshire! After a century more or less of almost futile efforts to sustain agricultural societies in our towns, some fifteen of us, under the most unfavorable circumstances, started the first Grange in our State, and now I behold this large assemblage.

Here are the solid, sturdy men and noble women from the Upper Coös to the Bay State border — from the fertile valley of the Connecticut to Piscataqua's flowing waters — from beyond the mountains on the north, to where old ocean's pulse beats the river's shores — all gathered here in this Queen City and manufacturing metropolis of our State, to promote the great primal industry of man, and build up our New Hampshire. In the day of small things, eighteen years ago, had anyone predicted such a meeting as this, representing one and a quarter hundred agricultural societies and a membership of more than nine thousand, and holding some three thousand meetings a year, I say, had any one predicted such results, he would have been regarded as the wildest crank that ever wasted humor in making insane predictions.

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During the year I addressed various agricultural meetings, and, if the people were as well pleased with my words as was I gratified by their work in building up this exceedingly useful society, and in studying the marvelously complicated and involved problems of agriculture, in order that their farms might be more productive and their homes more happy, then I am more than satisfied.

A few years since, how "like angel's visits, few and far between," were the gentlemen in the State, outside of the professions of law, theology, and politics, who ever attempted to address agricultural meetings. What a change for the better! I find at our meetings gentlemen have thoughts to tell, facts to state, experiments to describe, and suggestions to make, who can express what they have to say, both in words and manner which would be creditable to those who plead at the bar, lecture upon the platform, or minister at sacred altars. The papers by the ladies and their few remarks, and the recitations, readings, and declamations are of real merit, and would demonstrate, were proof needed, that these agricultural societies are of vast educational importance. The newspapers and essays read, and the books studied in preparing for these meetings, are numerous. In similar societies, the late Vice-President Henry Wilson, Governor Banks, our great Franklin, and many others received a large portion of the training which qualified them for the high positions which they filled.

I have often invited your attention to our State. Let us all appreciate this grand old New Hampshire, which the God of the universe, our Heavenly Father, with almighty power, infinite wisdom, and unfathomable love created for us. On what a grand, bold plan the Almighty architect wrought when he uplifted our mountains, fashioned our hills, moulded our valleys, and filled our Winnipiseogee with its hundred or more square miles of water, and placed its beautiful basin higher above the ocean's level than the summits of Egypt's loftiest pyramids. Then contemplate how from its lofty height the overflow of its pure waters in the joyous leaps of their eager rush to the mother ocean, as in youthful frolic and

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sport, turn the wheels to card, spin, and weave more cloth than could all the ladies in our State, or than does any other of the rivers of the world! The more we study and improve our State, the more shall we love her, and the more appreciate the goodness and wisdom of her builder. Earth's solid frame is a rough rock. Down from the north pole came the irresistible ice-plow of incomprehensible weight and incalculable power, grinding off the grit from which the sterling men of our State are made, and from the finer flour of which the bodies of our ladies are produced. Where, oh! where, on earth is there a better place to rear noble men and women than in New Hampshire? What State has ever surpassed her in this respect? Situated upon the sunny side of the midway line between the eternal ice of the north pole and the burning heat of the torrid zone, the Creator placed high on the mountain the image of a man, indicating that this was the place to rear him nearest perfection. How thankful we ought to be for our grand landscapes, our pure streams, our fertile vales, invigorating climate, and our healthful skies. Our lives are in the best period of the world's history, and our homes in a comparatively narrow belt which has produced the noblest men that earth has ever known. This narrow zone, in which it is our fortune to live, is the zone of the world's philosophers and poets, her scientists and artists, her patriots and statesmen. Strike out of the world's history the achievements of these men of the narrow belt, and what is left? Hence we see the wisdom of God in placing His Son in this, the man producing portion of the world.

Excuse me for repeating ideas I may have expressed before. Some truths, like the multiplication table, the ten commandments, and the sermon on the mount, ought to be repeated until they are familar; and so, I think, ought some of the felicities of the closing year of the nineteenth century and of our native State.

Progress is our watchword; perseverance our motto; our improved method and improved farm-stock, our creameries and silos are but points indicating our advance. The future opens up in glorious vistas.

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Our young or middle-aged may live to see an agricultural college in our State, with an annual income of a hundred thousand dollars and the world's best scientists in stock-breeding, and in feeding, and in all other departments of agriculture, teaching their sons and daughters. Oh yes, my brothers and sisters —

> We'll make our hills with deeper verdure glow,
> And our streams through richer meadows flow,
> So that when the people learn our way,
> Those who thought to scoff will come and pray.

Rev. George W. Patten, chaplain, made the following report:

REPORT OF CHAPLAIN.

BY REV. GEORGE W. PATTEN.

Worthy Master:

I have nothing of special importance to report in my department for the year just closing. I have made many visits to Pomona and Subordinate Granges, and have done my best to awaken an enlightened enthusiasm among our constituency; to arouse the dormant energies of the indifferent; and to strengthen and encourage the struggling Granges. Much more of this work is waiting and demanding to be done, in addition to the immense amount now accomplished by voluntary effort and private expense. I have no doubt but that the experience of every officer of this Grange coincides with mine, and that every one has had many more calls upon his time than he could answer, when the good of the order would have been undoubtedly promoted could he have responded favorably to the call.

But from the work which naturally gets itself done by those who believe in the holy mission of our order, the cause is prospering, and the master's report shows conclusively that the Grange in New Hampshire is in a live, healthy, progressive condition. The large majority of our members are intelligent, progressive, moral, and religious men and women.

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Everything goes to indicate that they are increasing in those attributes of manhood and womanhood, and characteristics of good citizenship, mainly through the instrumentality of our meetings, our coöperation and good fellowship. The amount of good that is done, the intellectual instruction and stimulus imparted, the social life and friendly comradeship engendered by those meetings are beyond all computation. I believe in the grand functions of the church with all my heart, but I see more clearly every year that the Grange is doing a much needed work that the church cannot do. It is demolishing the walls of partition among the sects. It is connecting a bond of union between all forms of belief. It furnishes a neutral field in which those of the most diverse theological and political beliefs and affinities may learn together, and unite in all good words and works for the elevation of the race, the amelioration of business and social conditions, and the promotion of good citizenship.

In saying this, I do not forget, but would rather accentuate, what you have already so well said in your report, that both sectarianism and partisanship shall be kept rigidly without our gates. We know no sect or party here. But we *do* stand for religion — for that practical christianity which is love to God and love to man, and which takes the Golden Rule as its watchword. We *do* stand for that conception of politics which is as broad as the duties of citizenship, which is coincident with political economy, the services of government, the best methods of promoting a clean and efficient public life and official service. It is part of our business to see that just and equitable laws are enacted and honestly enforced and executed, without fear or favor. It is one of our most serious concerns that our politics be purified, that bribery and political corruption of every kind and sort be purged away at whatever cost or trouble. We, as an order, stand for all these good things, are working for them with all our united powers, and will never cease to labor and wait and pray for their speedy accomplishment and realization.

One word upon another aspect of the work of the Grange.

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All that we can see or hear goes to prove that the degree work of our order is constantly increasing in efficiency and impressiveness. Every year Patrons are getting to appreciate the advantages of committing this work, which they are quick to see increases two-fold its beauty. May this good work go on till the rituals are as conspicuous for their absence as they are now for their presence. I need only to urge a little more attention to these details, a little more care in impressing on candidates the importance of keeping sacred and inviolate the secret symbols of the order, and a still greater effort on the part of all those in authority to extend the influence of our order, and bring all who are eligible within our hospitable gates.

Hon. J. M. Taylor, treasurer, made a report showing the finances of the State Grange to be annually improving. The amount of cash on hand was reported to be increased from $2,400.40 December 17, 1889, to $3,005.46 December 16, 1890.

REPORT OF SECRETARY.

BY N. J. BACHELDER.

Worthy Master:

We are again able to report a highly successful year for the Grange in New Hampshire, in fact, the most successful in its history, and without detaining you with preliminary remarks we will proceed at once to the statistical report. Subordinate Granges report quarterly to the State Grange, and the latest reports received are for the quarter ending September 30, 1890.

During the year ending September 30, 1890, there have been thirteen Granges organized as follows:

Tuftonborough, No. 142, Tuftonborough, Robert Lamprey, master.

Atkinson, No. 143, Atkinson, Herman Noyes, master.

Sunapee Mountain, No. 144, Goshen, Elias W. Pike master.

Pistareen, No. 145, Chesterfield, Winslow A. Partridge, master.

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Pequawket, No. 146, Conway, Joel E. Morrill, master.

Richmond, No. 147, Richmond, Almon Twitchell, master.

Hooksett, No. 148, Hooksett, W. L. Rogers, master.

Granite State, No. 149, Newton, Enoch Seavey, master.

Junior, No. 150, Goffstown, G. F. Farley, master.

Meridan, No. 151, Plainfield, Josiah Davis, master.

Blackwater, No. 152, Andover, George W. Stone, master.

Honor Bright, No. 153, Sullivan, Charles W. Buckminster, master.

Fitzwilliam, No. 154, Fitzwilliam, Timothy Blodgett, master.

During the year two Granges have been reorganized:

Cornish, No. 25, Cornish.

Warren Pond, No. 47, Alstead.

Making 122 active Subordinate Granges, September 30, 1890, with a membership of 8,954.

The additions are from the following sources: By initiation — males, 593, females, 660; by dimits — males, 45, females, 40; by reinstatement — males, 36, females, 18; by charter members of new Granges — males and females, 383; members of Granges reorganized — males and females, 38; making a total gain of 1,813.

The losses are: By suspension for non-payment of dues — males, 175, females, 124; by dimits — males, 87, females, 87; by withdrawals — males, 23, females, 28; by death — males, 23, females, 24; making losses to the number of 571. This, deducted from the total additions, leaves a net gain of 1,242, and a total membership for the year ending September 30, 1890, of 8,954, as stated above. The largest net gain of any previous year was 982.

Since September 30, three Granges have been organized:

Merry Meeting, No. 155, Alton, Charles M. Downing, master.

Surry, No. 156, Surry, William H. Porter, master.

Trojan, No. 157, Troy, H. M. Whittemore, master.

Making the present number of active Subordinate Granges, 125.

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The charter membership of these three Granges add 86 to the number, and with the probable net gain in the Granges of the State since September 30, our present membership cannot be less than 9,300.

Pembroke Grange, No. 111, stands at the head of the Grange column with 234 members.

Other Granges with a membership of 100 and over are as follows:

Amoskeag, No. 141, Manchester, 198 members.
Grafton Star, No. 60, Hanover, 174 members.
Thornton, No. 31, Merrimack, 173 members.
Cheshire, No. 131, Keene, 170 members.
Narragansett, No. 46, Bedford, 152 members.
Granite, No. 7, Milford, 145 members.
Harmony, No. 99, Sanbornton, 141 members.
Warner, No. 90, Warner, 141 members.
Uncanoonuc, No. 40, Goffstown, 138 members.
Souhegan, No. 10, Amherst, 135 members.
Friendship, No. 110, Northfield, 134 members.
McClary, No. 102, Epsom, 133 members.
Fruitdale, No. 106, Mason, 132 members.
Rochester, No. 86, Rochester, 122 members.
Hollis, No. 12, Hollis, 121 members.
Capital, No. 113, Concord, 114 members.
Loudon Surprise, No. 121, Loudon, 114 members.
Mt. Washington, No. 116, Whitefield, 112 members.
Winnipiseogee, No. 51, Meredith, 108 members.
Lebanon, No. 126, Lebanon, 107 members.
Rumford, No. 109, East Concord, 106 members.
White Mountain, No. 50, Littleton, 106 members.
Ashuelot, No. 129, Gilsum, 105 members.
Chichester, No. 152, Chichester, 103 members.
Merrimack River, No. 4, Canterbury, 100 members.

The number of Granges in this list has been increased from 22 to 25 during the year.

Fifty-seven Granges report a membership between 50 and 100.

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Granite Star, No. 60, Hanover, has initiated 53, the largest number initiated by any Grange. Hooksett, No. 48, Hooksett, has initiated 52; and Great Meadow, No. 138, Westmoreland, has initiated 48. Atkinson Grange, No. 143, has made the largest percentage of gain, having increased its membership from 21 to 59.

One Pomona Grange has been organized during the year, Mascoma Valley Pomona Grange, No. 7, Charles McDaniel, master.

The Pomona Granges in the State are seven in number, with a membership as follows:

Hillsborough County, No. 1, 178 members.
Eastern New Hampshire, No. 2, 526 members.
Merrimack County, No. 3, 415 members.
Belknap County, No. 4, 204 members.
Northern New Hampshire, No. 5, 156 members.
Cheshire County, No. 6, 245 members.
Mascoma Valley, No. 7, 171 members.

The total membership of these Pomona Granges, September 30, 1889, was 1,614. The total membership, September 30, 1890, was 1,895, making a net gain of 281.

The gains and losses are as follows: By initiation — males, 128, females, 103; by dimits — males, 7, females, 7; charter members of Pomona Grange, No. 7, 149; total gain, 394.

The losses are: by suspension for non-payment of dues — males, 54, females, 34; by dimits — males, 3; by withdrawals — males, 11, females, 7; by death — males, 2, females, 2; total losses, 113; leaving a net gain of 281, as stated above:

Cash receipts for the year are as follows:

Cash returns for the December quarter,		1889	. .	$687.84
"	" March	"	1890 . .	790.85
"	" June	"	1890 . .	816.63
"	" September	"	1890 . .	793.60
Total receipts as per treasurer's report			.	$3,088.92

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The receipts for the year ending September 30, 1889 were $2,970.40, making a net gain in dues and fees during the past year of $118.52.

Every Grange in the State is squared on the books of the State Grange to September 30, 1890.

The four Granges making the largest cash returns are located as follows:

Pembroke,	$82.50	Hanover,	$78.70
Manchester,	$72.52	Merrimack,	$55.40

The expenses of the office for the year have been as follows:

Postage	$115.94
Printing and stationery	70.50
Office supplies and incidentals	91.57
Total expenditures	$278.01

An itemized exhibit of the foregoing receipts and expenditures has been submitted to your executive committee, duly audited by them, and approved.

The Grange in New Hampshire has truly witnessed a year of remarkable growth and advancement. It is of a permanent character. There is still opportunity for extending its work, and let us legislate so wisely and work with such energy that the Grange will find an abiding place in every town in New Hampshire. This should be our goal, and with nothing less should we be satisfied.

E. C. Hutchinson, general deputy, made a comprehensive report giving the condition of the Subordinate Granges as reported to him by the district deputies and determined by visits in various sections of the State. C. H. Pettee, secretary of the executive committee, presented the report for that committee. The meetings were at Manchester, December 18, 1889; Concord, April 12, 1890; Concord, October 25, 1890; Manchester, December 16, 1890.

Reports of Pomona and Subordinate Granges by masters and

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delegates were then called for. Fifty-four masters and delegates responded to the call, after which further reports were postponed until Wednesday morning.

Recess was then taken to meet in public session at 7.30 o'clock.

Evening Session.

The meeting was opened with prayer by the chaplain, Rev. G. W. Patten. State Master McDaniel followed with brief remarks, stating that this occasion was one of the most joyous of the year, as we come together for the purpose of showing the progress and improvement made during the past year, which has been the most prosperous of any in the history of the Grange in New Hampshire, having gained in membership over one thousand two hundred. New Hampshire has done as well as could be expected, and her record for the past year is one to be justly proud of. If our young men had been at the session of the National Grange at Atlanta, and heard the reports from many sections of the West, and heard of the poverty shown by those reports, not another young man would be found who desired to go West; but instead all would be convinced that New England was good enough for the energetic young man, and that the only thing needed to make continued prosperity would be to stay at home and develop her agricultural resources, which would, in the near future, place her at the head of the nation as an agricultural community. He then introduced Master-elect E. J. Burnham, of Amoskeag Grange, who spoke as follows:

ADDRESS OF E. J. BURNHAM.

Worthy State Master, Patrons, and Friends:

It is with a sense of mingled pride and pleasure that Amoskeag Grange extends to you a cordial greeting on this occasion. You come as the worthy representatives of the organized farmers of New Hampshire. Prosperity has crowned your efforts during the past twelve months, and at no time in its

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history has the order of Patrons of Husbandry been so strong and united in New Hampshire as it is to-day. The harmony that has prevailed throughout the Granges is an earnest of the spirit which will guide your present deliberations. Under such favorable auspices we welcome you to Manchester once again. It is one of the wise provisions of the fundamental laws of our order that only those who come fresh from a year's actual service in the Subordinate Granges shall take part in the work of shaping the course of the State organization for the coming year. With few, if any, exceptions you have, during the past year, stood at the head of your respective Granges. You have watched over their development; you know their needs; and now, with your faithful wives, you come to labor for their welfare in a broader field. You come fresh from the ranks of the active workers; you have marked the spirit of progress; you know the temper of the people; you have learned the watchword of the times. I hold that no other organization is, or can be, better equipped for the achievement of a definite purpose. But what is that purpose? There is a certain question as old as language itself. It was asked, I imagine, as long ago as when man first began to struggle and to think. The ancient Romans put it briefly when they asked, *Quem ad finem?* — To what end? We, in our expressive New England vernacular, repeat it by asking, "What is the use?" Never, perhaps, was this question more frequently or more derisively asked than of the Grange in its early days; and never was it more nobly answered than in the line so familiar to you all, — "To develop a better and higher manhood and womanhood among ourselves." This is the sum of true progress, and human experience has shown that progress is best advanced by association. There is an Eastern allegory which a scholarly friend of mine delights in telling. It is to the effect that human progress is retarded by a massive wall. It stretches across man's pathway from horizon to horizon. It is too high for one to scale it, too thick to be broken through. But if earnest hands will but press against it, it will yield — slowly, indeed, but always something may be

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gained. It is the duty of every man and woman to help in moving on that mighty wall, and it has moved so slowly only because so few have done their part. Men and women, wrapped up in themselves, have selfishly stood aloof, ignoring the earnest workers, or scornfully asking, "What is the use?" But always, in all ages, some there have been who labored for the common good; and the wall has surely moved, albeit those who toiled might not mark its progress. And, so to-day, if the wall of progress is moving faster than ever before, it is because more have learned to work together. The individual sphere is expanding, homes are brighter on our hillsides and in our valleys, communities are happier, life is better worth the living by reason of organized effort on every hand. And when the best shall have been achieved under the guiding hand of the Great Master of the universe, when for mankind Faith shall have ripened into knowledge, when Hope shall have blossomed to fruition, when Charity shall be spread as a mantle over all the earth, and when Fidelity shall have gained its full reward, it will be found that in the great work of human progress the Grange has borne a noble part through the united effort of willing hands, prompted by earnest hearts. With a promise to join you in the labors of the day, in her allotted station, Amoskeag Grange gives you a hearty greeting.

Response was made by Col. W. H. Stinson, Past Master New Hampshire State Grange.

RESPONSE BY PAST MASTER STINSON.

Patrons, Ladies and Gentlemen:

It is no easy task that falls to my lot to respond to the cordial greeting which has been extended to us. It is, indeed, gratifying to remember that of the seventeen annual meetings we have had, fifteen have been held in Manchester. The wonderful growth of the New Hampshire Grange during the seventeen years just past is phenomenal, and that from a mere

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handful of members it has reached its present proportions is, to say the least, remarkable. The future welfare of the agricultural communities has been benefited by this association, and its beneficial effects deserve a place in the history of our State. "What is the use?" How often Brother Wason and I heard those words while canvassing the State in the interest of the Grange some years since. In Cheshire county we heard it the most, and to-day every town in the county, except one, has its Grange, and one town has two. This shows what a persistent, well-directed effort will accomplish, and the record shows that the words, "It's no use," did not prevail. We have been greatly benefited by the papers in the State, and the first paper to establish a Grange column and department was the "Manchester Union," which was interested through the earnest requests of Brother Burnham; and the help it has given our organization has been great indeed. Other papers have followed its lead, and now the press almost to a unit are in favor of and friendly to our order. All should contribute to the prosperity of your beautiful city; and I wish you prosperity in your Grange work, and may you never falter in well doing.

This was followed with a song by Sister M. Ella Huntress and Brother Fred Allen, of Amoskeag Grange. The song brought out rounds of applause from an appreciative audience, and they returned and sang another duet, "What happy, merry times we'll see."

In the absence of the mayor, who was compelled to be away on account of business arrangements, the following letter of welcome to the city was read:

OFFICE OF THE MAYOR,
MANCHESTER, December 16, 1890.

To Mr. McDaniel, Master State Grange:

DEAR SIR, — In response to your kind invitation, I should be most happy to be present to-night at the meeting of the New Hampshire State Grange and as chief executive of the city of Manchester to speak a word of welcome to its members; but an engagement, which makes

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my absence from the city imperative, prevents. But you may be sure that my endorsement is not necessary to make you all welcome to our city. Our citizens are always glad to have the representatives of the farmers of the State visit us. We feel that it is good for us all to exchange ideas, and to learn more of the desires and needs of those of our people who are engaged in different pursuits from ours. Our merchants are especially glad to have you visit them, if not to buy, to examine the large stock of goods they carry, to learn their prices, and to see what business is really done in our city. We feel that Manchester presents unusual facilities for such meetings, in the railroad and hotel accommodations; and we are always glad when our opinions are justified, as they are by your selection of our city as the place of your meeting. I trust you will have a pleasant visit to Manchester, and will take a good look at her mills, her streets, her stores, her houses, and her people; and that you will be so well pleased that another year will find Manchester the unanimous choice of your members as the place of your meeting.

Respectfully,

D. B. VARNEY, *Mayor*.

The response was made by Past Master G. A. Wason, of the State Grange.

RESPONSE BY PAST MASTER WASON.

Worthy Master and Patrons:

No one regrets the absence of the mayor more than I do, as I well know the kindly welcome he would give us to this beautiful city which we have seen grow from the wilderness, as it were, to its present grand proportions, in a moment. Several of the veterans who were in Boston the past summer from the West were here on a visit, were shown about the city, admired the beautiful views to be had from our eastern hills, and then went to see the mills, which they examined from the foundation to the upper floor, and examined the various processes that the cotton went through during its manufacture, and they were filled with wonder at the great mills of Manchester, whose products are sent all over the globe, whose locomotives are traveling the iron all over the country, whose

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board of trade has issued such an attractive pamphlet, describing Manchester's industries, that a boom will come greater than any in California; and I am afraid that my farm, only twelve miles out, will be staked out in building lots very soon. Only twice have the meetings of the State Grange been held outside of Manchester. Manchester is the only place that can sustain the State Grange. So, brothers, look around and get acquainted, and you will want to come to Manchester hereafter. There is great ground for hope. Let us live in hope, for half the towns in New Hampshire have Granges, and it is to be hoped that in the near future there will be a Grange in every town. The old cry that "farming don't pay," is dying out, and intelligent methods prove that farming does pay; for a farmer that I met in the northern part of the State received three hundred dollars for the potatoes that grew on one acre, and the price per bushel was forty cents. New Hampshire soil beats the West, and it is proven where intelligent labor and steady work are put into it. No one can say that farming does not pay and look over this intelligent audience. I hope that you progressive farmers will keep on until you have a Grange in every town along with your church and school. The main trouble with farming is, that the majority look too much to the dollars, and not enough for comfort. Now, Patrons, let us remember that we have as good a climate as any, that we have a free flag over our heads, and with the Grange banner in the lead there is no better place on earth than New Hampshire.

A duet was then sung, "Music at Nightfall," by Sister Wason, of Nashua, and Brother Rice, of Worcester, Mass. This song was greeted with very enthusiastic applause.

The next speaker was Brother B. P. Ware, of Marblehead, Mass., past master of the Massachusetts State Grange, who spoke as follows:

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ADDRESS BY BROTHER B. P. WARE.

Worthy Master, Patrons and Fellow Farmers:

From what you have heard, you will see that by previous speakers the ground has been so admirably covered that there is little left for me to say. I congratulate you on your prosperity, and can say that while the order is not sectarian it is a religious order, and its first principles are those of christianity, and where it is a question of church or Grange, the broad principles of christianity as taught in the Grange accomplish, in many instances, what no church would have done. Without prosperity in agriculture we can have no national prosperity, for agriculture is the bone and sinew of the nation. The head of the agricultural department of our government has been raised to the dignity of a cabinet officer, and it was through the Grange that this was done. The farmers are protected by the Legislature and the outlook for continued prosperity is encouraging. Any reasonable request they ever may make of the Legislature will be granted. Whatever you may ask, see to it that the request is reasonable and just, and by so doing the Grange will be a powerful factor in benefiting the agricultural portion of the country. The Farmers' Alliance is an offshoot of the Grange, and its freshness is apparent in the demands it makes for legislation. I regret that the National Grange has recommended some of their wildcat schemes, and in this case they have slopped over, and I appeal to your conservatism to denounce these schemes and not be misled into these schemes of getting something for nothing. Necessity has compelled your great men to make the efforts which have made them famous, and it is necessity that will spur us on to success. I am glad to see so many here and to observe the interest exhibited at this meeting; nothing more is necessary than to keep on in the good work, and we will learn that "nothing succeeds like success."

The duet, "On Mossy Banks," was rendered by Brother Allen and Sister Huntress, after which His Excellency Gov.

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D. H. Goodell was introduced. After the applause had subsided, Governor Goodell spoke as follows:

GOVERNOR GOODELL'S ADDRESS.

Worthy Master, Brothers and Sisters:

I am proud to stand here to-night and be able to say that I am a member of the Grange, and am pleased to learn of our great prosperity. The Grange seems to be on the boom. As everything in the country is booming, we are glad to learn that the boom has reached the Grangers of New Hampshire. The cry that "farming don't pay" is not true, and the present progress in agriculture is in a measure due to the grand educational work of the Grange. The deposits of our savings banks in New Hampshire have largely increased during the past year, and the increase is mostly in the farming communities, where the rate per capita is more than double what it is in the cities and large towns. It is said that the farmers are the bone and sinew of a nation. We farmers of New Hampshire are the backbone of the State, as well financially as in brain and bone. The farmers of New Hampshire are more well-to-do than any other class in the State, and I have found by all observations that I have been able to make, that it is safer and better to invest our capital at home and boom our own towns. The work of taking up the deserted farms in the State is progressing rapidly; over 300 of these deserted buildings are now inhabited, and soon the deserted farm in New Hampshire will be a thing of the past. Never has this State been so prosperous as during the past year, both in farming and in manufacturing, and we must advertise our success and keep up the boom.

Hon. G. Byron Chandler, of Manchester, member of the State Forestry Commission, was then introduced, and spoke as follows:

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ADDRESS OF HON. G. BYRON CHANDLER.

Worthy Master, Ladies and Gentlemen:

The lateness of the hour warns me not to speak at much length on this subject of forestry, which is one in which I am deeply interested. I will say that if the Grange had been organized and in as flourishing condition as now, some thirty years ago, I should probably have stayed on the old farm in Bedford; for I was born and brought up on a farm, where, if I had stayed, I should have hoped to make a success of it. We have but little done in this country, as regards forestry, compared with what has been done in that line in Austria and other sections of Europe, but we will look at the intrinsic value of our forests. Formerly the chief value was for wood, and the custom was to cut down everything and clear the ground. The day for the market value of wood as a source of profit is gone by, and we hope to have the small growth left when a lot is cut off; and this by its growth will soon create another forest. I hope to see the time when we shall have a competent forester employed to look after this matter. I have great enthusiasm for this State, and hope I may always live here, and that when I die it may be beneath the skies of New Hampshire.

State Lecturer J. D. Lyman then said, —

Worthy Master and Patrons:

I bought an acre of land twenty years ago for three dollars, and have given a man forty dollars' worth of wood, and the land is worth sixty dollars to-day. Now, go right home, say your prayers, and go to bed.

The public session was declared closed, and after a brief secret session the Grange was closed in form to be again opened at 9 o'clock A. M. on the following day.

SECOND DAY.

The Grange assembled at 9 o'clock and was opened in due form. The committee on credentials reported the presence

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of twenty-four additional members, after which the following list of standing committees was announced:

STANDING COMMITTEES.

Division of Labor and Master's Address. — W. D. Tuttle, East Andover, chairman; Amos Fletcher, Nashua; Andy Holt, Lyndeborough; F. M. Davis, Hancock; Mrs. Isaac Newton, Acworth; Mrs. F. H. Weld, Cornish.

Finance. — J. S. Freeman, Lebanon, chairman; Lowell T. Mason, Canterbury; G. D. Armstrong, Amherst; J. W. White, Derry; Kimball Webster, Hudson; F. H. Weld, Cornish; Mrs. W. U. Carlton, Goffstown; Mrs. C. W. Bedell, Littleton; Mrs. J. E. Shepard, New London.

Good of the Order. — T. E. Hunt, Gilford, chairman; W. S. Keith, Milford; Erastus Reed, Claremont; W. P. Farley, Hollis; Isaac Newton, Acworth; S. H. Abbott, Wilton; D. W. Burnham, Greenfield; J. G. Reed, Merrimack; Mrs. C. T. Mason, Canterbury; Mrs. M. F. Hill, Washington; Mrs. Andy Holt, Lyndeborough.

Resolutions. — J. E. Shepard, New London, chairman; J. D. Lyman, Exeter; M. E. Osborn, Peterborough; C. H. Dimick, Lyme; T. J. Courser, Warner; T. S. Pulsifer, Campton; T. O. Taylor, Sanbornton; G. W. Stone, Andover; Mrs. Erastus Reed, Claremont; Mrs. G. D. Armstrong, Amherst; Mrs. D. W. Burnham, Greenfield; Mrs. H. O. Hadley, Temple.

Coöperation. — L. F. Batchelder, Tilton, chairman; G. F. Mills, Dunbarton; G. E. Anderson, Londonderry; C. P. Farley, Bedford; J. F. Dickey, Alstead; F. H. Clough, Lancaster; R. A. Moore, Monroe; G. W. Fisher, Boscawen; Mrs. H. C. Felch, Bradford; Mrs. D. H. Tufts, Strafford; Mrs. Charles McDaniel, Springfield; Mrs. D. S. Woodman, Strafford.

Transportation. — James Davis, Gilsum, chairman; C. W. Bedell, Littleton; R. T. Gould, Hopkinton; H. C. Felch, Bradford; David Noyes, West Canaan; Albert Stevens, Canaan; F. W. Flint, Hillsborough; Mrs. Alvin Davis,

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Canaan; Mrs. G. H. Towle, Deerfield; Mrs. W. D. Tuttle, East Andover; Mrs. T. J. Courser, Warner.

Publications.—M. F. Hill, Washington, chairman; Alvin Davis, Canaan; H. M. Worthley, Hebron; D. S. Woodman, Strafford; M. L. Lord, Dover; Mrs. T. O. Taylor, Sanbornton; Mrs. W. W. Burbank, Webster; Mrs. B. C. Brockway, Newbury.

Education.—G. H. Towle, Deerfield, chairman; G. M. Springfield, Rochester; C. A. Fowler, Sutton; W. W. Burbank, Webster; F. T. Collins, Gilmanton; Mrs. J. H. Tripp, Epsom; Mrs. W. L. Fiske, Dublin; Mrs. M. C. Stone, Swanzey; W. L. Rogers, Hooksett.

Agriculture.—J. M. Carr, Wilmot, chairman; J. H. Tripp, Epsom; B. F. March, Mason; H. P. Blake, Hill; Wallace Burleigh, Franklin; J. E. Frye, East Concord; George Farr, Littleton; Mrs. J. B. Corliss, Laconia; Mrs. R. B. Foster, Loudon; Mrs. C. H. Barnes, Walpole.

Mileage and Per Diem.—Lucien Thompson, Durham, chairman; M. C. Stone, Swanzey; W. H. Parker, Whitefield; F. A. Badger, Belmont; C. S. Hodgdon, Barnstead; J. B. Corliss, Laconia; C. H. Barnes, Walpole; Mrs. F. J. Lawrence, Jaffrey; Mrs. G. J. Bennett, Westmoreland; Mrs. F. C. Hamilton, Chesterfield.

Constitutional Amendments and By-Laws.—Oliver Drake, Chichester, chairman; J. R. Farnham, Marlborough; R. B. Foster, Loudon; A. K. Roberts, Tuftonborough; Mrs. James Davis, Gilsum; Mrs. Almon Twitchell, Richmond; Mrs. A. K. Roberts, Tuftonborough.

Claims and Grievances.—D. W. Rugg, East Sullivan, chairman; C. W. Farwell, Keene; S. J. Swallow, Rindge; G. J. Bennett, Westmoreland; Adam Dickey, Manchester; Mrs. G. W. Stone, Andover; Mrs. Timothy Blodgett, Fitzwilliam; Mrs. G. F. Farley, Goffstown.

Dormant Granges.—W. U. Carlton, Goffstown, chairman; G. S. Kingsbury, Nelson; L. T. Haley, Wolfeborough; Fred J. Lawrence, Jaffrey; Robert Lamprey, Tuftonborough; Mrs. C. W. Emery, Canterbury; Mrs. T. E. Hunt, Gilford; Mrs. D. W. Rugg, Sullivan.

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Trials and Appeals. — Herman Noyes, Atkinson, chairman; Perley Lear, Goshen; Almon Twitchell, Richmond; Enoch Seavey, Newton; C. H. Downing, Alton; F. E. Nesmith, Surry; Mrs. C. S. Hodgdon, Barnstead; Mrs. Lucien Thompson, Durham; Mrs. T. S. Pulsifer, Plymouth.

Unfinished Business. — D. R. Wyman, Concord, chairman; F. C. Hamilton, Chesterfield; G. F. Farley, Goffstown; H. W. Woodbury, Sullivan; Timothy Blodgett, Fitzwilliam; Mrs. G. W. Fisher, Boscawen; Mrs. G. F. Mills, Dunbarton; Mrs. C. A. Fowler, Sutton.

SPECIAL COMMITTEES.

Taxation. — C. H. Pettee, Hanover, chairman; W. L. Fiske, Dublin; V. C. Brockway, Newbury; Harvey Jewell, Winchester; C. W. Emery, Canterbury.

Music. — F. W. Prichard, New Ipswich, chairman; E. K. Jewett, Milford; J. M. Hayes, Dover; Mrs. C. W. Farwell, Keene; Mrs. M. E. Osborn, Peterborough.

The following telegram was received and greeted with enthusiastic applause:

LEWISTON, MAINE, December 17, 1890.

Charles McDaniel, Master N. H. State Grange:

The Patrons of Maine in their seventeenth annual session, five hundred strong, send greeting to their Brothers and Sisters in New Hampshire.

RUFUS PRINCE,
Master Maine State Grange.

The following response was sent:

MANCHESTER, N. H., December 18, 1890.

Hon. Rufus Prince, Master Maine State Grange:

Your fraternal greetings are enthusiastically received. Please accept ours in return, representing nine thousand New Hampshire Patrons.

CHARLES MCDANIEL,
Master N. H. State Grange.

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Election of member of executive committee was then made, resulting in the choice of Brother Daniel W. Rugg, of Sullivan, for the constitutional term of two years.

On motion, the master's address was referred to the committee on Master's Address and Division of Labor.

On motion of Brother Pettee, the reports of secretary and treasurer were referred to committee on Finance.

A cordial invitation was extended to the State Grange and visiting Patrons, by Amoskeag Grange, to meet them at a banquet at their hall, at 5 o'clock this afternoon.

The Grange was declared at recess, until 1.30 o'clock P. M.

Afternoon Session.

At the expiration of the recess, the Grange reassembled, and the work was continued.

The hour of special assignment having arrived, namely, the exemplification of degree work, the first and second degrees were conferred by Granite Grange, No. 7, of Milford.

The work was performed in an exceptionally fine manner, and was followed by various questions on the unwritten work and the imparting of the new A. W. by the worthy master to masters and delegates of Subordinate Granges.

On motion, a vote of thanks was extended the officers of Granite Grange for the very able manner in which the degree was conferred. A vote of thanks was also tendered the choir for their services in this exercise.

The report of the special committee on taxation was then made by C. H. Pettee, chairman.

REPORT OF COMMITTEE ON TAXATION.

BY C. H. PETTEE.

Worthy Master and Patrons:

There are always radicals enough who are ready to tear away the foundations of all law; with these your committee does not desire to be classed. We think it wise, before pointing out any defects, to congratulate you and ourselves upon the

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generally favorable status of our laws upon this subject, for we are in no such condition, as regards taxation, as are some of the other States in the Union. For instance, the Patrons of Pennsylvania claim that real estate in that commonwealth bears, on the average, a tax nine times as large as that levied on personal and corporate property.

The Legislature of New Hampshire has always contained a goodly portion of the farming element, and of others who are in sympathy with the masses. The results are seen in our generally just system of taxation. Progress naturally creates new conditions which necessitate changes in existing laws; moreover, weak points are occasionally developed which require strengthening.

Your committee would recommend but few changes in the fundamental system of taxation. We find, notwithstanding the constitutional prohibition of double taxation in our State, that the United States and state courts, on various pretexts, mainly resting on long usage and precedent, uphold a double tax upon certain forms of property, thus producing an injustice which legislation alone can remedy. To illustrate: Take the case of a mortgage. Suppose, on the first of April, that A has one thousand dollars in gold, B has the same, and C has a farm worth two thousand dollars. They are taxed on these several properties at a total valuation of four thousand dollars. Before the end of the year A purchases C's farm, paying his own thousand dollars in gold and B's thousand dollars which he has borrowed, giving as security a mortgage on the farm for the amount of the loan. With April comes the assessor, who finds that C, instead of owning the farm, is the possessor of two thousand dollars in gold; accordingly a tax is levied upon that. A holds the farm, and is taxed on its two thousand dollar valuation, while B is taxed for the thousand dollar mortgage he holds, making a property total of five thousand dollars. By this transfer, in some mysterious manner, there has been created for taxation purposes an extra thousand dollars, which it is evident does not exist.

To illustrate even more clearly, if possible, the evanescent

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character of this extra thousand dollars. Suppose A and B had become equal partners in the purchase; then the assessor could have found nothing taxable excepting the *real* property, namely, the farm and the gold. This statement of the case is no fiction of the imagination, but has been long recognized by thoughtful writers.

Probably the strongest argument that can be advanced in support of the present system is the well recognized law that any system of taxation, if persisted in and enforced, will tend in time to distribute its business over the entire community. For example: if a special tax were levied on cobblers, so far as these workmen were able to add this to the price of their work the community would, of course, bear the tax instead of the cobblers. So far forth as the tax was paid by the cobblers themselves, the profits would be decreased, and only those who were satisfied with the lessened gains would continue in the business. If, however, fewer men took up the trade, increased patronage for these might again help to distribute the burden of taxation.

If our present law of taxation was uniformly enforced, it would, without question, largely regulate itself. But it does not follow, on the other hand, that the distribution made would prove beneficial to the State. As a matter of fact, we find that in its practical working the law acts to discourage borrowing and home investment. It is for this reason that your committee so strenuously recommend a change in the law. They would prefer to suggest a remedy which should cover all kinds of credits, but they find serious constitutional difficulties in going beyond the subject of mortgages. Inasmuch as nearly all credits may be put into the shape of mortgages, a remedy applicable to those would prove almost complete. We would therefore recommend the adoption, substantially, of the law which has worked successfully in Massachusetts for some ten years. Under it the mortgagee is made the owner of the property to the amount of the mortgage, for the purposes of taxation. By this change in the law, we should lose one per cent tax on about twenty millions of dollars, the

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larger part of this being savings bank loans. The amount of this tax would, of necessity, be raised in other ways. Is it possible to supply the deficiency without an additional tax levy? This leads up to the question of the enforcement of existing laws.

According to the State reports for 1889, we have invested in New Hampshire savings banks some sixty-two millions of dollars, every dollar of which pays a tax, because of the strict supervision by state commissioners. Outside of these banks only eight millions worth of loans were reported for taxation. That this gives any fair idea of the amount loaned by individuals, no sane person will contend. For facts and figures to illustrate this opinion, we refer to the able speech of Hon. Samuel C. Eastman, speaker of the New Hampshire House of Representatives, delivered before the House, August, 1883. It is probable that were taxes generally paid on money loaned, no additional levy would be required to supply the deficiency occasioned by the suggested change.

We have at present an iron-clad law, which requires the tax-payer to take oath each year as to the truth of his inventory. This law is, however, often evaded.

After a careful study of its provisions, we have arrived at the conclusion that there is already law enough, if carefully enforced, to bring out a considerable portion of the tax, which in the past has been evaded. We do, however, think the laws governing the conduct of public officials concerned, need strengthening. At the least, there should be full publicity of returns, and any small number of tax-payers should have sufficient power to compel a delinquent assessor to perform his duty. We recommend such changes in the law as will bring about these results.

It is now quite generally recognized that there has been an over valuation of farm property, naturally following the depreciation which has been going on for many years. As this is a matter largely in the hands of the farmers themselves, it would seem that calling attention to it would be sufficient to rectify the injustice.

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As a matter of fact, discussion has already brought about a partial remedy.

It is often claimed that certain forms of property are undervalued; without doubt some means might be devised to more nearly equalize valuations, and any proper legislation in this line should be welcomed.

Manufacturing property is most frequently referred to as being undervalued.

There is no doubt that assessors, to say nothing of the state board of equalization, do not make proper allowance for the difference in actual value of hazardous manufacturing properties, and those long established corporations whose stock remains fixed at a high premium for a series of years.

For example: we chance to know of a certain large corporation whose valuation has been based on the market rate of its stock. This was scaled down to seventy per cent to correspond, as was said, with other properties. In this case, it is thought by some, the market value of the stock does not fully represent the existing property, as there is on hand a large surplus; but, at any rate, the price of that stock is practically an auction rate, which needs very little, if any, scaling down in comparison.

Possibly some slight changes in existing laws would bring about an improvement, though an enlightened public sentiment would do more.

With reference to exemption of manufacturing property for a period of ten years, your committee would ask whether anyone can point to any single case where an exemption for six years would not have produced identically equal results as regards time and place of location. If not, the duty of the Legislature is plain, the time of exemption should be reduced.

We are aware, also, that there is a manifest injustice in compelling the whole State, and especially whole counties, to bear a share of the burden of exemption, especially as county taxes are usually largely increased by the presence of manufacturing centres; but we are of opinion that it is better to unite with the conservative elements of manufacturing towns,

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in saving a whole four years' tax, than to antagonize this element in an effort to save a small fraction only through the whole of ten years.

In closing, your committee would recommend the following:

Resolved, That we favor such a modification of existing taxation laws as will prevent double taxation.

Resolved, That we recommend such legislation as will bring about a more thorough enforcement of present laws.

Resolved, That we favor a six year exemption law instead of ten.

Resolved, That we urge the Legislature, at its coming session, to give these matters earnest attention, in order to bring about a much needed reform.

Remarks were made upon the subject by Brothers Patten, Connor, and Webster.

On motion, the report was laid on the table for further consideration.

The worthy master appointed the following memorial committee on death of deceased members:

T. E. Hunt, Mount Belknap Grange.
G. W. Patten, chaplain, State Grange.
J. M. Connor, Union Grange.
R. A. Moore, Monroe Grange.
D. W. Burnham, Greenfield Grange.
F. T. Collins, Crystal Lake Grange.
Mrs. Isaac Newton, Cold River Grange.
Mrs. T. O. Taylor, Harmony Grange.

Recess was then declared until 7 o'clock.

During the recess the officers and members, and visiting Patrons partook of the banquet tendered by Amoskeag Grange. Over five hundred sat down to the well laden tables spread in the banquet hall of that Grange. The feast was replete with choice delicacies in such abundance as is seldom seen. Fine music was discoursed in the hall during the banquet.

It was the most extensive and elegant of all Grange banquets ever served in the State, and words fail to express the gratitude

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and appreciation of those who were so fortunate as to be present.

Evening Session.

The Grange assembled at 7 o'clock, and nine persons were instructed in the fifth degree, and the sixth degree was conferred in ample form upon one hundred and twenty-two candidates.

The report of the committee on Division of Labor and Master's Address was made by W. D. Tuttle, chairman.

REPORT OF COMMITTEE ON DIVISION OF LABOR AND MASTER'S ADDRESS.

BY W. D. TUTTLE.

Worthy Master and Patrons:

Your committee on Master's Address and Division of Labor offer the following report:

We have carefully considered the master's address, and regard it as an able and comprehensive document, well worthy the consideration of every Patron of Husbandry in New Hampshire. It treats of the leading agricultural topics of the day in a manner not to be misunderstood, and strikes the key-note for advancement all along the line. We recommend that the portion of the worthy master's address in regard to Juvenile Granges be referred to committee on Good of the Order; that portion in regard to education, be referred to committee on Education; also, that portion in regard to the College of Agriculture and Mechanic Arts, and to the Thompson will, to the same committee; that in regard to agriculture, to the committee on Agriculture; the part regarding constitutional amendments, to committee on Constitutional Amendments and By-Laws; that portion relating to the press, to the committee on Publications; the articles in regard to deputy inspection work, State Grange Fair, and fire insurance, to the committee on Good of the Order. We would also recommend that the portion of the address relating to deceased members of our order be referred to a special memorial committee.

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The following telegram was greeted with applause:

WORCESTER, MASS., December 17, 1890.

Charles McDaniel, Master N. H. State Grange:

Your fraternal greetings received at the hands of Past Master Ware. A thousand Patrons of Massachusetts send cheers, and bid you God-speed in your work.

N. B. DOUGLASS,
Master Massachusetts State Grange.

The following letter from Hon. C. E. Tilton was read by the secretary, and referred to the committee on Resolutions:

TILTON, N. H., Dec. 13, 1890.

N. J. Bachelder, Esq., Secretary:

MY DEAR SIR, — Your favor inviting me to be present at the State Grange meeting at Manchester, Dec. 16, is received. I thank you for the invitation. Previous engagements prevent my acceptance, though I should be pleased to meet you all there, for I feel much interest in your welfare.

New ideas are carried from your meetings to your farms, which tend to improve them, and improvement in your farms means better times, better schools, and better governments.

The Federal government is aiding in the education of your sons in a most substantial manner, giving to this State this year $35,000 for agricultural schools, which sum will be increased by $1,000 each year for the next ten years, until the State of New Hampshire will receive annually $45,000 for agricultural and mechanical schools and colleges. This will afford nearly a free education to your children, if wisely handled.

You are aware of the Act of Congress passed last summer appropriating to each State $15,000, to be increased by $1,000 each year until the sum of $25,000 is reached, which is thereafter appropriated annually to each State for the benefit of agricultural colleges established, "or which may be hereafter established."

I would suggest that no question before your meeting needs a more careful consideration than the question of how this money can be used to the greatest advantage of the farmers.

Have the results of the present Agricultural college been entirely satisfactory to you, or have they been commensurate with the expenditure of public funds for the college?

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Now seems to be the exact time for the farmers of this State to determine as to the future status of their educational facilities. The new Federal appropriation has just commenced. The Legislature of this winter is to determine where and by whom the money is to be expended. Wherever it is sent, the future appropriations will go; for in two years from now so much will have been expended at the location that a change will not be deemed advisable.

I believe in giving our farmers' boys the widest educational advantages possible, for they are to be the bone and sinew as well as the brain of the nation.

Why not establish another agricultural college in the eastern or central part of the State, which would be easy of access to those who cannot well reach the extreme west of the State?

The new law mentioned permits such a course, and leaves it with the Legislature to apportion the money.

Your organization finds Tilton a convenient and pleasant home for your annual fair; centrally located and handy for all parts of the State. Is it not a good place for another agricultural college?

Arrangements could be made for at once furnishing recitation rooms for students until suitable buildings of its own were erected. Assistance could be had for providing the State with a proper farm for the college, and this new gift from the government will support it, while I feel sure that a large number of boys who cannot or will not go to Hanover would come to the new college.

As I have said, it is in the power of the Legislature to establish a second college, and you, being the parties in interest, can command the will of the Legislature if you will unite on a course to be pursued.

If the Grange wishes to make an effort in the direction I have suggested, I will second them before the Legislature and elsewhere.

A bill establishing a second college and taking with it the latest government appropriation can be prepared and presented to the Legislature. Supported by the farmers of the State it will become a law.

Kindly bring these thoughts to the attention of the meeting, where I hope they will be fully discussed.

Very truly yours,

C. E. TILTON.

Memorial services were then held in respect to the memory of the deceased members named in the master's annual address, after which, in token of further respect, the Grange was closed to meet again at 9 o'clock A. M. on Thursday.

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THIRD DAY.

The Grange assembled at 9 o'clock, and after the transaction of considerable routine business Mrs. C. W. Emery of Canterbury, chairman of the committee on Woman's Work presented the following report:

REPORT OF COMMITTEE ON WOMAN'S WORK.

BY MRS. C. W. EMERY.

Worthy Master and Patrons:

Your committee are pleased that an opportunity is given to call your attention to the work done by the matrons of the Grange, and to a few of the many ways in which our grand organization may assist the sisters and daughters.

Our first thought goes out to the children. We feel that they have not received the attention in the past that is their due, and we earnestly recommend that this State Grange adopt the Ritual for Juvenile Granges.

If we wish the young members of our homes to assist in perpetuating our beloved order, we must educate the children to appreciate its beautiful teachings.

It seems to your committee that this auxiliary to the Subordinate Grange supplies a long-felt need.

It is well known to you all, that if a Grange is failing or has become too weak to stand alone, it is the sisters who prepare and administer frequent doses of fragrant coffee, hot oysters, and other edibles so essential to its recuperation. If a Grange hall is to be built, the matrons raise a large part of the funds. If a hall is furnished or an organ purchased, it is the sisters who cannot rest until the debt is paid. Almost invariably the sisters sustain the music, that element so essential to a successful Grange. If a choice literary programme is to be furnished, it is often some sister who gives the gems of the programme, the spicy paper, the delightful song, or the interesting and instructive essay.

Our New Hampshire roster shows that nearly forty per cent

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of the lecturers and secretaries of the Grange are sisters; this means that nearly half of the work requiring accuracy, honesty, and business and literary ability, is done by women. The worthy general deputy testifies that whenever the sisters are doing this work the Granges are in a prosperous condition.

And yet, while the sisters are permitted to do all this, while theoretically they stand equal with the brothers, and while individual women are being benefited by this noble order, your committee feel that women, as a class, are not receiving the benefits of the organization to the extent that is desirable.

Our worthy master of the State Grange, ever ready to recognize the principle of equality, tells us in his unrivalled annual address, that "woman has an equal voice and vote, and is eligible to each and all offices in the Grange, from the highest to the lowest."

We have yet to see a bright sister's ability recognized in the State Grange by the honor of the chairmanship of the committee. Our representative officers are not counted worthy of invitation to grace the stage on state occasions.

But these are only trivial matters compared with the fact that we are not working for our daughters' welfare as we are for our sons'.

While we are all brothers and sisters, working hand in hand for the elevation of the farmer, for his advancement, mentally and materially, urging the needs of our boys, striving for an agricultural college worthy of the name, that shall enable its students to stand in the front ranks, nothing is being done directly for our girls, the future wives of New Hampshire farmers.

There are plenty of schools where they can learn the languages, mathematics, music, and all the so called higher branches; but no school where they can learn the chemistry of cooking, or the art of house-keeping, the making of the marketable cheese or gilt-edged butter, home sanitation, and mechanical arts.

We sincerely hope that, while you are carefully considering as to the best way to expend the bounty of the general govern-

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ment, you will remember the educational needs of our girls. If our State is to receive its greatest revenue from the summer boarder, the art of cooking is more important than the art of feeding cattle and sheep, and home sanitation of vastly more consequence than veterinary surgeoncy.

To us it seems that the women and girls of New Hampshire are as much in need of help in the house and dairy as all the men and boys in the field and on the farm. Compare for a moment, in your own minds, the requirements of the two spheres, and you will realize that, if only for the sake of the future farmers, a helping hand should be extended to the daughters. This aid should come from the Grange. We should open the doors of the agricultural college to the girls on equal terms with the boys; and we should see that chairs are established that the girls may learn those arts and sciences so essential to the perfect house-wife and successful farmer, and which cannot be learned in the other schools.

The admission of women to the college is of small advantage, unless their practical educational needs are met.

Kansas and Michigan are leading the way in this great reform; let the old Granite State take up the good work.

Remarks were made by Brothers Pettee, Jewell, and Wason, followed by the adoption of the report.

On motion of Brother Shaw, voted that a committee be appointed to present matters suggested in the report to the Legislature.

The following letter was received from Brother Mortimer Whitehead, lecturer of National Grange:

PATRONS OF HUSBANDRY, NATIONAL GRANGE,
OFFICE OF LECTURER, WASHINGTON, D. C.,
December 16, 1890.

Charles McDaniel, Worthy Master N. H. State Grange:

MY DEAR BROTHER, — A short, busy year has run away since I was with you at the State Grange, and all day I have been thinking of the many good sisters and brothers of your good Grange State who are gathering once again in annual session. While I will not be able this year to be with you in person, and meet face to face the many good

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friends I have met in Grange meetings and by hospitable firesides, I wish to assure one and all that in spirit I am with you now, and desire to extend fraternal greetings across the rivers, valleys, and mountains that are between us. Our order has made grand progress during the year, and New Hampshire Patrons have reason to rejoice over their share of the harvest. Good, earnest work on the lines marked down in our "Declaration of Purposes," and a faithful adherence to all the laws and usages of the order *always* bring success. Wishing you a a pleasant and profitable session and a bright and happy new year after the joys of Christmas-tide, I remain,

Fraternally,

MORTIMER WHITEHEAD.

The following resolution was offered by Brother James Davis, of Gilsum, and, on motion, was referred to the committee on Good of the Order.

WHEREAS, It is of the utmost importance to the welfare of our order that the "Unwritten Work" should be imparted by all deputies in a manner uniform and exact before all Granges; therefore, be it

Resolved, That the master of the State Grange be empowered to arrange for a meeting of the general and district deputies at some central point at the earliest date practicable, when the "Unwritten Work" and other matters pertinent to our order shall be carefully explained, and the necessary traveling and hotel expenses shall be allowed to all deputies attending.

Resolved, That, in view of the great importance of this work, the State Grange hereafter provide for the mileage and per diem of district deputies to the annual session of the State Grange, at which time the said meeting for special drill and instruction shall be held.

H. B. Holman, chairman of the committee on Experiment Station, made the following report, which was adopted:

REPORT OF COMMITTEE ON EXPERIMENT STATION.

BY H. B. HOLMAN.

Worthy Master and Patrons:

Your committee appointed at the last session of this Grange, to visit the Agricultural college and Experiment Station, beg leave to submit their report:

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We are thoroughly convinced that the faculty of our College of Agriculture and Mechanic Arts are working in unison with our farming interests, and with the funds now at their disposal, will labor to give us an institution that will be an honor to the State, and on a par with similar institutions elsewhere. We have inspected the workshop connected with the mechanical department, and there find evidence of great skill among the students in the various branches taught. We believe this practical course to be of the utmost importance to all those studying to become agriculturalists. It must be evident to all who visit this department that the accommodations are entirely inadequate to the growing wants of the college; and we are satisfied that it would be of great advantage to the college, the Grange, and the State, that suitable buildings be erected to meet these wants.

On inspection of the work of the Station we find that the experiments spoken of in the report of last year are being continued, the results of which will be found in the bulletins issued from the Station. These bulletins can be had by applying to Professor Whitcher, and we earnestly recommend that they be carefully read and preserved for future reference.

Your committee have made a thorough inspection of the farm, and find under cultivation 110 acres, 10 acres of the same being sprout land, producing nothing before being plowed, and yielding this season at the rate of 20 tons of ensilage per acre.

A small portion of the same piece was planted with potatoes, and the yield was at the rate of over 200 bushels per acre.

Sixty acres are in mowing, cutting 90 tons of first and 25 tons of second crop.

Seventeen acres produced 325 tons of ensilage, mostly Sanford's sweet corn; 8 acres in four varieties of millet, averaging 2½ tons per acre; total, 14 tons; the variety producing the largest yield being the German, which Professor Whitcher recommends to all farmers using the millets.

Six acres in winter rye, yielding 10 tons, cured for fodder to be fed in connection with ensilage.

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Four acres of oats cut for ensilage, producing 15 tons.

One acre in oats and vetches, yielding 6 tons for ensilage.

One acre of Japanese buckwheat; yield, 40 bushels.

One acre of potatoes; yield, 175 bushels.

Ten acres pastured in a rotation experiment, and 2 acres in garden, etc.

In addition to this 110 acres, there is a young orchard of four acres just coming into the bearing.

The income from the farm the past year has been about $2,500.

Since a year ago there has been added to the barn a wing designed to accommodate 54 head of stock up stairs, not including calves, and 7 below. This is one of the most needed improvements, and adds greatly to the looks as well as the convenience of the buildings. It is built in a thorough and substantial manner, having good drainage and ventilation. The design is to keep the bulls entirely separate and out of sight of the remainder of the stock, in apartments built for that express purpose on the lower floor. At the end of the cow stable are pens, which can be divided to any desired size by movable gates, for the use of calves, etc.

At the opposite end of the stable is a finely constructed silo of 125 tons capacity, all feed being conveyed to the stock on a car hung from overhead, and running from near the silo the entire length of the alley.

A creamery is being fitted up in the basement of the Experiment Station building with all the modern appliances for the manufacture of gilt-edged butter.

Your committee do not think it best to make a long report, by entering into the minute details of work at the college and station, but advise all who are interested in what is being done there to visit Hanover, assuring them that they will feel well paid for the time and expense.

L. F. Batchelder, chairman of the committee on Coöperation, presented the following report, followed by its adoption:

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REPORT OF COMMITTEE ON COÖPERATION.

BY L. F. BATCHELDER.

Worthy Master and Patrons:

History teaches that ever since the foundation of the world coöperation has existed, it exists to-day, and that it should continue to exist there can be no question. Coöperation is not only necessary to success, but success in almost any undertaking, especially in any effort of organization, is a proof of coöperation, while failure generally results from the absence of this principle.

Coöperation implies intelligence, education, confidence, civilization, and social development.

Among its results are a higher order of intelligence, steadfast integrity, praiseworthy ambitions, and nobler purposes. To effect any good purpose in its fullest extent requires the coöperative action of all interested. For instance, to maintain and build up the cause of education, requires the coöperation of teacher, parent, and pupil. This is but a truism of universal application; it follows, therefore, that if agriculture is ever to receive a fair profit, if it is ever to be relieved of unjust burdens, these blessings must come through coöperation among those interested in the objects to be obtained, and in no sense is this coöperation more essential than in an educated ballot among those who follow the plow or wield the hoe. It is well known that before the Grange sprang into existence the farmers gave little or no attention to any interest save that of production.

During the long period anterior to the birth of the Grange, other classes were not idle in caring for both their general and special interests. As a natural consequence, our statute books are burdened with laws granting special privileges to special classes, and most generally at the expense of agriculture, the great wealth-producing class. To correct these abuses will require the earnest coöperation of those whose rights are thus infringed.

Education is, therefore, the important work of our order,

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and education is but a corollary of coöperation. As we all know, some most important advances toward reform have been made during the two decades last passed. We can reflect with pride that almost all of these originated with our order, or resulted largely from public sentiment moulded by the Grange.

Your committee deem it unnecessary to enter into any extended report in rehearsing what has resulted from coöperation, or enumerating ways in which it should exist, believing it is a matter which is receiving the attention of the Grange and its Patrons.

One matter your committee wish to bring before the Granges of New Hampshire for their consideration, is the matter of double taxation, and also the matter of exempting property from taxation.

As is well known, a great deal of property in manufacturing places is exempt from paying taxes for a term of years. But taxes must be paid, towns and cities must have money for municipal purposes, consequently the farms are more heavily taxed and the farmers thereby are made to pay more than their proportionate share of the public expense. We believe the principle is wrong, and we are glad this matter, together with double taxation or taxing mortgaged property, has received, and is receiving the attention of the Patrons. It is a matter that can be properly discussed in Grange and agricultural meetings, and we urge such discussion and such coöperative action upon the matter as shall mould public sentiment in the way that shall call for the repeal of such unjust laws.

At the session of the National Grange, in 1888, the committee on Coöperation in their report offered resolutions favoring the establishment of retail stores, of a wholesale, purchasing, distributing, and sale agency in each State Grange jurisdiction, and of a wholesale jobbing house to be established by the wholesale purchasing agencies.

We would recommend a careful consideration of the matter embodied in these resolutions by the Granges of New Hampshire.

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We believe that in the matter of buying and selling, and in many of the business affairs into which the farmers enter, they would be greatly benefited by a more complete coöperation.

We would also recommend and reiterate the sentiments and ideas expressed in the excellent report of the committee on Coöperation of last year. We believe that report worthy of the attention and careful consideration of each Patron. We wish to congratulate the Patrons of New Hampshire upon the continued success of the Grange Fire Insurance Company. To the Patrons of our State this company has given a cheaper rate of insurance and thereby has been a source of saving to them. The more coöperation we have of this sort, the better.

Certainly there is benefit and advantage in coöperation. There is advantage in it socially, intellectually, financially, and morally. History proves it, and the history of our order shows it. Therefore we say, let us study the important subject of coöperation and consider it in all its bearings.

Let us be in full sympathy with all sentiments and movements in favor of organization and coöperation in agricultural circles, and let us seek to give such movements a more rapid growth.

The Grange is an organization instituted for the benefit and advancement of the farmers. As such it has been of great value and interest to them. Its influence for good is being felt throughout our land. Its teachings and principles are making a nobler manhood, a more refined womanhood, and better citizens; and again we urge careful attention to and earnest consideration of this subject of coöperation. Work for the advancement of the principles of the order and all interests pertaining thereto, and let there be such coöperation as shall make the Grange in a fuller sense what it is, one of the best and purest of organizations, and an indispensable help to agricultural progress.

George H. Towle, chairman of the committee on Education, presented the following report:

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REPORT OF COMMITTEE ON EDUCATION.

BY G. H. TOWLE.

Worthy Master and Patrons:

Your committee upon Education submit the following report:

Education — to cultivate the intellect, to deepen and perfect the character, to improve and exalt the entire man — is one of the central pillars in the edifice it is the purpose of our organization to erect. Upon this we build, not only for the present but for the future. Other aims and objects we may and do have, which may call for vigorous effort and high endeavor, which have to do only with the temporal and physical well-being of our fellow-man. These, in coming time, from changes of condition and circumstances so rapidly taking place in the evolution of society, may perish or be forgotten; but one mind raised from the depths of ignorance to the sphere of intelligence and wisdom, one beclouded and darkened soul, to whom the treasure-house of knowledge has been unlocked, can never perish or be forgotten, but must go on communicating the divine light it has received in ever expanding circles throughout an endless eternity.

We heartily endorse that portion of our worthy master's address in reference to education, and urge upon the Subordinate Granges the claims of our Agricultural college and the benefits that may be derived from a careful consideration of the work of our Agricultural Experiment Station. To promote, elevate, and strengthen every judicious agency for the education of the youth of our State should, in the future as in the past, receive our cordial and united support.

The facilities and advantages in our rural or agricultural towns, available for the proper education of our youth in our public schools, as compared with those secured to the youth of our cities and manufacturing centres, it is the purpose of this report to briefly examine. It may be well, in the first place to inquire as to the theory and fundamental principles upon which our public school system rests.

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Where is the justice, equity, or necessity of the State assuming the prerogative of taxing all, whether they be childless or have children, for the education of all? The only answer that can be given for the assumption by the State of such authority, is that it has the undoubted right to perpetuate itself, and there is no dogma of statesmanship more indisputable, than that ignorance, with its associate vice, is the most terrible foe by which a free state can be assailed. A state may be overrun by hostile enemies, its public buildings and works of art demolished or destroyed, its treasures exhausted, and its population decimated, and if the intelligence and virtue of its citizens be preserved it will quickly recuperate itself; but let it be overrun and borne down by a flood of ignorance, and it can only rise by a slow and painful process of discipline and education.

It is clear, then, that the State is not only exercising its legitimate function, but is performing a sacred duty to all its citizens, when, by law, it lays its hand upon every individual, whether a parent or not, and commands him to contribute according to his means for the common defence — the repelling of the most dangerous foe of all popular governments — the education of the children, not his children in particular, but all children. All this is conceded by every Protestant. Catholics, I believe, dissent and claim that the right and duty of education belong to the church. Now, then, it follows that this high and responsible duty of the State should be administered impartially and equitably to every child of the State. It is clearly the duty of the State to secure to the youth of the farming towns as nearly as possible equal school privileges with those of our great manufacturing centres.

Ignorance and vice among the rural population is no less lamentable and inimical to the safety and prosperity of the State than among the residents of cities. The claim of the child in the remotest hamlet is as sacred as of that living in the very shadow of city hall in this metropolis.

If we turn to the report of the superintendent of public instruction for the year 1888, we find that the city of Man-

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chester expended of the public funds, upon her public schools, $62,000, or $14.76 for each scholar; the assessment rates for schools in Manchester were only two and six tenths mills on a dollar. In the thirty-five towns in Rockingham county, outside of Portsmouth and Exeter, the school revenue amounted to only $62,000, or $7.50 per scholar; and the assessment rates reach two and nine tenths mills on a dollar. In Portsmouth there was expended $28,000, or $15.96 for each scholar; the assessment rates are not given. In Concord there were expended $43,000, or $15.26 for each scholar; and the assessment rate was nearly four mills on a dollar. Throughout Merrimack county the average amount expended per scholar was only $8.14, and in the exclusively agricultural towns much less; while the assessment rates average about three mills on a dollar. In Keene the amount expended per scholar was $12.07; in Dover, $15.65 for each scholar. The amount expended upon each scholar in Belknap county was $7.15; Cheshire county, $9; Carroll county, $5.97; and in many of the exclusively farming towns only from $4 to $5 per scholar. But we will not dwell upon these, to many, uninteresting statistics, but simply say that those we have given are fairly illustrative of the many we might adduce, and, in fact, all that there are bearing upon the subject. Nor is the enormous disparity in educational advantages as shown by the figures fully realized until we consider, in connection with them, the steadily increasing obstacle of a sparse population, rendering it necessary to maintain a large number of small and uninteresting schools; while in the large towns and cities the pupils are brought together in the most convenient numbers for thorough and systematic instruction, rendering it far more economical than it is possible in farming towns. And yet the figures show conclusively that throughout the State there is expended of public funds about double the amount upon the city boy or girl that there is upon the country boy or girl; and the assessment rates are no higher in cities than in towns. And under the rapid depreciation of value in farming sections there

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can be but little hope of a change for the better in the near future. On the contrary, the present trend must continue while the present law remains, fixing the town as the political school unit.

A remedy was sought in 1885 by abolishing the district system, which had come down to us from the early part of the present century, for the town system. The district system had signally failed to supply the requisite school privileges to the thinly settled portions of our State. Will the present law supply the long-felt needs of our rural population? In 1886 the Superintendent of Public Instruction, in his report vindicating the change and urging its advantages, says: "We have become a manufacturing State, and the attractions of business have drawn our people into the villages and cities. Agricultural labor upon farms that have lost their primitive productiveness having ceased to be remunerative, our sons and daughters have gradually drifted away from the rural districts, leaving but few children and a reduced aggregate of taxable property. This is true as to school districts, and it is no less true as to whole towns; and the town system in no way remedies the difficulty." He says: "It will be no longer possible for a rich district, by squandering surplus funds upon a few pupils, to deprive all of the other scholars in town of a portion of their legitimate schooling. It will be no longer possible for the village child to secure thirty or forty weeks, while the boy or girl on the farm gets but ten or fifteen because he happens to live in a poor district. It will be no longer possible to limit a heavy tax-payer in a poor district to one half the schooling of a non-tax-payer in a rich one. * * * The law requires an approximate equality of school privileges." Herein he congratulates the people and the Legislature that a very desirable and judicial gain has been made.

But it *is* yet possible for large towns to expend large sums upon their schools, and the pupils to secure thirty or forty weeks of schooling, while the pupils of a farming town are limited to ten or fifteen. It is yet possible for a heavy tax-payer in the town of Springfield, worthy master, to be limited

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to less than half the schooling of the non-tax-payer in any city of the State. There is no approximate equality of school privilege in New Hampshire; nor can there be until the whole State is made the political school unit, dispensing the inestimable blessings of free public schools with impartial hand to every child in the State.

While the present system of expending school revenues remains, can we reasonably anticipate that our higher institutions of learning will flourish? that our normal school and Agricultural college will be filled by farmers' daughters and sons who have had no adequate school privileges? Is it any wonder that they are struggling to maintain a precarious existence after fifteen or twenty years' faithful and arduous labor by the professors and friends of these institutions.

A thorough reorganization of our public school system upon the recognized principles of justice to all and impartiality to none, would establish a free high school in every town, under thoroughly competent male teachers, in which every boy might be fitted for the Agricultural college. Such schools in our country towns would give an impetus to education, and inspire a *love* of learning that might fill the Agricultural college with earnest, eager students. Upon such a system of high schools the college might rest for support with confidence and security, and be the crowning ornament of a structure whose outlines were symmetrical, and whose foundations were securely laid in justice and equity.

There is another phase of this problem, which, to properly treat, would transcend the limits of this report; and yet from its importance, we do not feel at liberty to close without alluding to it. The public policy of our State, as outlined by His Excellency Governor Goodell and endorsed by the Legislature, is, that a strong and persistent effort should be made to stay the depopulation of the rural sections of our State by the proper use of all legitimate means at command. If my observations over a limited portion of these towns have not been misleading, there is no other cause operating so powerfully and continuously to depopulate these sections as the proper school

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advantages of which these towns are unjustly deprived by the present policy of distributing the school *revenues.* It takes the best — the enterprising, middle-aged men and women with families. When the children reach the age that requires better school privileges to fit them for the struggle of life amid the tremendous activities of the age in which their lot is cast, the old homestead is sold or abandoned, and they go to the cities or larger villages. In this they are actuated by the loftiest motives and inspired by the most sublime sentiment that ever moved civilized man to dare and to do — the welfare of their offspring. In vain will be the effect of commissioners of immigration to secure a reoccupation of these abandoned farms by desirable citizens, until the cause which has led to their desertion is recognized and removed.

Remarks upon the subject of the report were made by Brothers Lyman, Connor, Woodman, and others, followed by the acceptance of the report; and it was ordered printed in the Journal of Proceedings.

James Davis, chairman of the committee on Transportation, reported as follows:

REPORT OF COMMITTEE ON TRANSPORTATION.

BY JAMES DAVIS.

Worthy Master and Patrons:

Your committee respectfully submit for your consideration the following items and hope they will meet your approval:

We would reiterate and recommend the adoption of the first eight items of the report of your committee on transportation of last year; and lastly, we think the time is ripe and the present an opportune moment for the executive committee to present and impress the incoming State Legislature with the necessity of taking some action looking to the appointment of a state commissioner, with the end in view that the State should take charge of highways, or more particularly our country roads.

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It is a well known fact that one half of the annual tax raised to repair our hill roads is more than wasted, and some united action must be taken by the Patrons in order to keep our roads open in the summer, to say nothing of our eight months of winter.

Your committee are of the opinion that if one half of the money raised annually was used to pay interest on bonds issued by the State to the towns for purpose of giving the towns a large sum of money to be expended for permanent improvements of our road-beds, under the charge of competent state officers, good highways would be the result, and the towns could create a sinking fund and keep them in repair with the other half.

The old *party* and district school jealousies, that have run riot in the past, make it impossible for local authorities to do satisfactory work with the power that they have at their command, and, as they generally have new men in command every year, each one with an *idea* that he knows best how to repair roads, the results are three-gutter roads, one in the middle for water, and one on either side in spots for looks, with eight or ten-inch sluices from the top of the hills, and water-bars that not only destroy our horses and wagons but help to make mankind profane.

It is well known that New Hampshire has just entered upon an era of summer boarding and *money-making*, but we cannot expect to reap the full benefit of this *boom* unless we can have roads on which city people can feel safe and comfortable in their many excursions to our hill-tops.

Trusting this brief report will impress the minds of the executive committee in a manner that will be favorable to some action of the State.

J. M. Carr, of the committee on Agriculture, submitted the following report:

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REPORT OF COMMITTEE ON AGRICULTURE.

BY J. M. CARR.

Worthy Master and Patrons:

Your committee beg leave to present the following report:

Feeling that the subject of agriculture is one of the utmost importance to our State and nation, and that something must be done for its upbuilding, and that before long; that the present depressed state of agriculture is due to the agriculturists themselves, is partly true, in that they have too long neglected having a voice in the legislation of our country, and in uniting for their mutual protection and advantage; the farmers need to be aroused to the fact that the only successful manner in which to deal with the corporations, capital, combinations, etc., that are controlling our country to-day, is to form a gigantic union of their own, to protect their rights and further their interests.

Your committee recommend that this be strongly urged during the coming year, and also the fact that farmers must be placed in our legislative bodies, in order that the farmers' interests may be protected.

In considering the matters of our state agriculture, let us first look at the soil, climate, and character of the State, and see what can best be produced; the principal wealth of New Hampshire is its forests, and their wide-spread destruction cannot be viewed with other than the greatest dismay by those interested in the agricultural wealth of our State.

That the forests have a great and beneficial influence upon the climate and soil is now acknowledged by all intelligent minds; and that removal is a great damage is obvious by looking at the reports from Germany and Switzerland, where the mountain sides have been rashly cleared, and where 300 years will be required to repair the damage.

New York has aroused to the importance of preserving her forests, and has set a wise example by purchasing large tracts in the Adirondacks for preservation, and entering upon forestry as a state business, employing a number of foresters.

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That immediate action is needed in this direction is very evident to one who traverses our State; and your committee recommend the presentation of a petition from this body to the next Legislature to take action thereto.

The wool-growing industry forms no small part of agricultural production, our hills being the right place for sheep to thrive on, and sheep being the best stock for the hills.

Boussingault tells us that the value of sheep manure to that of ordinary barnyard manure is as 300 to 108, conclusively proving that sheep are the best stock for New Hampshire pastures; but from all parts of the State come such complaints of the depredations of dogs upon the flocks, that there seems danger of this industry dying out if something is not done to protect them. There have several instances come to our notice of sheep owners who have gone out of the business simply from this cause.

We believe that all branches of agriculture should be fostered by the State, as upon the welfare and prosperity of her people depends her strength; in pursuance of this we recommend the drafting and adoption by this body of a bill, to be presented to the next session of the Legislature, asking that all dogs running at large be muzzled from May first to November tenth. If such a bill can be passed, sheep can be kept in this State, in proportion of thirty sheep to each ten cows, as our pastures have much feed good for sheep that cows will reject, and the income from lambs and wool will pay well.

The low prices for all farm products leave but little margin for waste in any direction; and we would urge upon the farming population the necessity of condensing, and instead of working a large territory poorly, with great expense of hired help, to work less but better, and secure from one half well worked as much as was formerly secured from the whole.

Produce the best of everything. With the present low prices, we believe that a small quantity of superior quality is more profitable than a large one of medium quality.

Work in some special line. No person can be good at

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everything, and the farmer is no exception. What that line shall be let each one's inclination, market facilities, soil, and climate determine.

The Experiment Station is a great advantage to the farmers, and should be encouraged in all possible ways; the farmers' attention should be called to it and its value will be more fully appreciated. In order that this may be done, we suggest that the bulletins be placed upon the lecturer's table of each Subordinate Grange.

The grateful thanks of all the people of our State should be extended to our State Secretary of Agriculture for his efficient war upon oleomargarine and protection of pure butter.

Your committee have examined and heartily endorse the report of the state master referring to agriculture.

A discussion followed, participated in by Brothers Lyman, Pritchard, White, Varney, Freeman, Smith, Newman, Dimick, Jewell, Haley, and others.

On motion, the portion of the report relating to Forestry was referred to the executive committee, followed by the adoption of the balance of the report.

J. E. Shepard, chairman of the committee on Resolutions, reported as follows:

REPORT OF COMMITTEE ON RESOLUTIONS.

BY J. E. SHEPARD.

The committee on Resolutions beg leave to submit the following report:

Resolved, That in our opinion the general government ought *not* to go into the banking business to supply any particular class of the people or any institutions with loans, *either with or without interest;* but that it is the *duty* of the government to supply the people with a proper amount of sound currency.

Resolved, That a copy of the foregoing resolutions be forwarded to each member of Congress from New Hampshire.

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Resolved, That we favor the acceptance by the State of the provisions of the Thompson will.

Your committee have carefully considered the letter of our friend, Hon. Charles E. Tilton, which has been referred to them.

While we are of the opinion that Tilton, from its central location, would prove an excellent location for a state agricultural college, and while we should prize most highly the counsel and assistance, naturally accompanying such location, of him who has already proved his friendship by many deeds, still we are strong in the belief that the State should take no action which should unnecessarily divide and weaken efforts to firmly establish agricultural and other technical education in the State.

The funds *furnished by the national government* are deficient to thoroughly equip one first-class college *in a manner satisfactory to Patrons and their sons.*

While we see in the provisions of the Thompson will great advantages accuring to the youth of the next generation, we have before us no practical proposition for the technical education of our sons during the next twenty years except through our present college at Hanover; therefore,

Resolved, That we heartily second the trustees and faculty of our college in their efforts to build up and equip a first-class Agricultural and Mechanical college which shall be a source of pride and gratification to all Patrons. We earnestly commend this to the young men of New Hampshire who desire a thorough technical education, and we pledge our support in its behalf.

Resolved, That we endorse the efforts being made by the Commissioner of Agriculture in calling public attention to the natural attractions of New Hampshire and to the best of our vacant farms, and ask the Legislature to make provision for extending this work, especially in the direction of making known the advantages of our State as a health and summer resort.

Resolved, That in a government founded upon the will of

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the people, the far-reaching influence arising from the purchase of votes threatens the very existence of free institutions; and that in aid of the purity of elections and to secure an honest ballot, unaffected by bribery or intimidation, we favor the Australian system in its entirety, as with such modifications as the experience of the States where it has been adopted has shown to be an improvement on that system.

Resolved, That in the interest of the whole people we favor such legislation as tends to prevent the adulteration of food and drinks, and protect the community from fraudulent adulterations and the sale of commodities under any other than their true name; and we most earnestly support and urge the passage of the measure now pending before Congress known as the "Conger Lard Bill," or some similar measure.

Resolved, That we commend the faithful effort on the part of the State Board of Agriculture in enforcing the oleomargarine law, and request the board to continue constant in its enforcement.

Resolved, That we are emphatically in favor of temperance, the enforcement of the laws and the instruction of the youth in its principles.

Resolved, That we pledge ourselves to increased energy for the upbuilding of our noble order.

The following circular in regard to "Temple to Ceres" was read and, on motion, the matter was referred to the executive committee for action on the part of the State Grange, and to the various Pomona and Subordinate Granges of the State for consideration and action:

TEMPLE TO CERES.

To Masters of the State Granges:

WORTHY BROTHER, — Please have read the following to your Grange, also communicate the same to all Pomona and Subordinate Granges in your jurisdiction. Please appoint a committee of ladies to push this matter, and ask that similar committees be appointed in every Grange in your State.

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TO PATRONS OF HUSBANDRY.

The National Grange Patrons of Husbandry, at its recent session in Atlanta, Ga., adopted a resolution appropriating twenty thousand dollars out of its permanent fund to be used in the erection of a Temple to Ceres, as a home for the order of Patrons of Husbandry, in the city of Washington. This sum to be available when the further sum of thirty thousand dollars shall have been raised by voluntary subscriptions.

The executive committee of the National Grange directed the undersigned to issue this circular asking voluntary contributions of faithful Patrons in erecting a suitable home for our grand order, which will worthily represent agriculture and our membership, and be a fitting testimonial of the estimation in which are held the services to American agriculture of the seven founders of the order of Patrons of Husbandry.

An appeal is hereby made to faithful Patrons and all friends of our order to contribute "a free will offering," so that there can immediately be erected a Grand Temple which will not only serve as a home for the Grange but the rental of which will produce a sum sufficient to permanently pay all the expenses of the National Grange, thus leaving the present income free to be used in the lecture field.

The plan adopted is to ask: Each State Grange; each Pomona Grange; each Subordinate Grange; each individual Patron; each Woman's Work committee, to contribute to this fund by furnishing bricks for the Temple.

As soon as practical each contributor (subscribing not less than $1.00) will be furnished with a handsome lithograph, showing them to have contributed to so grand an object; and besides, the names of all contributors will be enrolled in the *Special Roll of Honor* to be preserved in the Temple for all time, and published in such Grange papers as will contribute space therefor.

All committees on Woman's Work are requested to lend a helping hand in this noble work, to act promptly so that the work can be completed without delay.

Bricks will be sold at one dollar each. Books with bricks

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for enrolling names and full instructions will be supplied on application.

All money should be sent as fast as contributed to John Trimble, Secretary National Grange, P. of H., 514 F street, Washington, D. C., who will deposit the same in the Fiscal Agency, where it will draw interest until a sum sufficient is secured to begin the work.

A building of this character will give dignity and position to our order and advance the material welfare of agriculture far beyond the cost; and it is earnestly hoped that every Grange and every member of the order will give of their means liberally, not grudgingly or of necessity, but with cheerful hearts and willing hands, aid in the proposed plan, to show to the world and to our national legislators that what other societies do in this direction can be done as cheerfully and on as grand a scale by the farmers of America.

For bricks, information, etc., apply to

X. X. CHARTTERS,
Box 33, Washington, D. C.

Brother Stinson offered the following:

WHEREAS, The cordiality of the welcome in so many ways accorded the State Grange at this seventeenth annual session by Amoskeag Grange of Manchester and for the fifteenth time in the history of the State Grange, must come home to each and every Patron; and,

WHEREAS, It may be a pleasant token of our appreciation of the courtesies extended, to have our expression duly engrossed, to be transmitted by the Secretary to Amoskeag Grange for their reminder; therefore,

Resolved, That the New Hampshire State Grange hereby place on record the deep sense of fraternal recognition they fully realize as due Amoskeag Grange for the reception and attention so heartily evidenced by these hall decorations, the eloquent words of welcome by their representative, Brother Burnham, and the sumptuous, rich, and finely served banquet, replete in all details, furnished by the accomplished sisters, of which we so enjoyably partook, and which renders this act of the State Grange but a slight assurance of the appreciation felt unanimously for these many acts; and may prosperity and fraternity

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ever float from their standard in the onward and upward march of the Grange, thus contributing to the continued welfare of our *grand* order in the old Granite State.

Worthy Chaplain Patten spoke as follows:

Worthy Master:

I cannot let this occasion pass without attempting to voice more fully the feelings and sentiments of this Grange in regard to the splendid hospitality extended to us by the sisters and brothers of Amoskeag Grange, culminating most appropriately and charmingly in the banquet of Wednesday evening. We appreciate most feelingly the honor done us. We appreciate, as only hungry Patrons can, the profusion of good things provided for the comfort of the "inner man." We appreciate, as only civilized human beings can, the pleasing and appropriate adjuncts of table and banquet hall, and the delicate and efficient ministrations of the sisters, to whom we, as an order, are so conspicuously indebted. This sense of obligation is never absent from our hearts or our thoughts. We see evidences of woman's influence, tact, delicacy, and ability in every department and function and operation of any growing and progressive body. We become more conscious daily that without her wise and loving counsel, her inspiring presence, her deft touch, and kindly oversight, our order would lose enormously in that attractiveness and usefulness which are extending its beneficent influence from Maine to California, from the Atlantic to the great lakes. As we journey through life and note how large a part of existence is of a somber hue, and how much aid, comfort, cheer, encouragement come from woman's heart and hand, the words of Scott are often in our minds:

"O woman, in our hours of ease,
Uncertain, coy, and hard to please;
And variable as the shade
By the light, quivering aspen made;
When pain and anguish wring the brow,
A ministering angel thou."

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What son can fail to do honor to the sex which furnishes the mothers of our race, and from which proceed all that is noble and best to humanity. "They naturally pour the wine and oil, Samaritans in every condition." From the profoundest and most honorable impulses of their hearts, our sisters pour out beneficence, healing, and Christian spirit to all within their reach; and no less profound and universal and influential in their nature is that impulse of hospitality to which we owe so large a measure of the success, the charm, and the ability of the Grange, and which furnished no insignificant part of the enjoyment and grand success of the banquet by which we have been honored.

The resolutions were enthusiastically adopted, after which the Grange was declared at recess until 1:30 o'clock.

Afternoon Session.— 1:30 o'clock.

The Grange reassembled, and, after due examination, was declared open for labor.

On motion, the report of the committee on resolutions was taken from the table, and the resolutions were severally adopted, followed by the adoption of the report of the committee.

The following resolution, offered by Worthy Chaplain Patten, was adopted:

Whereas, The memorial exercises are undoubtedly among the most important that claim the attention of the State Grange, and are due to the services and virtues of our departed sisters and brothers; and,

Whereas, Their influence for good is, or might be, incalculable upon our members, especially the young, and will incite us all to emulation as we dwell upon those excellencies which memory shall retain to bless us; therefore,

Resolved, That it is the sense of this Grange that time shall be devoted to these services by those who have the programme in charge, in full consonance with their transcendent importance, when there is a full convention and ample time for seemly and adequate consecration and reverent attention, and when our deliberations are not being constantly interrupted by departure from the hall and other distractions.

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On motion, the report of the committee on Taxation was taken from the table and considered, resulting in the adoption of the report, except the clause recommending the reduction of the limit for which property may be exempted from taxation from ten to six years, which was laid on the table.

Report of the committee on Mileage and Per Diem by Lucien Thompson, chairman. Showed the number of miles traveled by the officers and members in attending the session to be 9,580; number of days' attendance, 478½; and total expense to State Grange, reckoning two cents per mile one way, and $1.25 for each day's attendance, $789.72. This was an increase over the previous session of 788 miles' travel, 5½ days' attendance, and $22.62 in expense.

J. S. Freeman, chairman of the committee on Finance, made a report, followed by the report of the committee on Good of the Order, by Chairman T. E. Hunt.

REPORT OF COMMITTEE ON GOOD OF THE ORDER.

BY T. E. HUNT.

Worthy Master and Patrons:

Your committee on Good of the Order, in submitting their report, are fully aware of the fact that the subject is one of the greatest importance, and to consider all the topics that might suggest themselves would be beyond the time at our disposal. We cannot urge with too much force the supreme importance of keeping the Grange just what its noble founders designed it should be, a farmers' organization, pure and simple. This will require at all times, on the part of the Subordinate Granges, the utmost vigilance. The controlling element of political power which has been made manifest in the recent elections, now rests with the farmers of this country, and they are coming to assert the power and exert the influence to which their large numbers justly entitle them. Hence we believe it to be of the utmost importance to the future welfare of the Grange that the professional politician be excluded from membership in our order, "they have not

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a sufficient direct interest in tilling the soil, but their whole interests are in conflict with our purposes."

We believe sounder advice never was given than that contained in the report of the committee on Good of the Order at the ninth annual session of the State Grange, of which our worthy master was chairman, when it said, "guard well the gates, that none may be admitted to membership on grounds of personal friendship, unless well satisfied that they are eligible, and in conforming to the requirements of our order will become worthy and respected members. Our safeguard is the "ballot," to prevent the unlawful and improper admissions.

We would also favor the policy of establishing a reading circle on the Chautauqua plan; we firmly believe much good would result, not only to those who took part, but to listeners as well. Each Grange could devote a part of each meeting to this exercise. If the Granges generally would adopt this, we believe that good results would follow. In the early history of the Grange, something of the kind was planned by Brother Thomas, secretary of the Pennsylvania State Grange, but, as far as we know, was not very generally adopted by the Granges of this State; the rapid growth we have attained since would seem to warrant that now was a proper time to start again.

We would earnestly urge all Patrons to connect themselves with the Pomona Grange, in whose jurisdiction they may reside; none can afford to remain outside this branch of our organization. Here, new and extensive acquaintances are formed, and the public meetings are of such a character that much can be learned and much good will result; but in order to obtain the highest degree of good in this direction, all must perform each and every part assigned them, there should be no excuses; let the programmes be prepared both in Pomona and Subordinate in advance for the year, then those placed thereon would have ample time to prepare their part, and thus the meetings would be made more interesting and profitable.

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We also believe there should be a more earnest and thorough observance of Children's Day. We would suggest that the Grange coöperate with the board of education in their several towns, that all the children connected with the public schools may receive the benefits of this Grange festival.

In connection with the proper observance of Arbor Day, we would suggest to the Grange that if there are any neglected cemeteries in their midst, they devote a part of the day to beautifying these silent cities, great need of which we have seen in many parts of our State.

Your committee have carefully considered that part of the master's address in relation to Juvenile Granges, and unanimously recommend it be adopted by the Granges. We also most heartily endorse and concur in all that was said by the worthy master in his very excellent address in relation to deputy inspector's work, State Grange fair, fire insurance, and the Patrons' Relief association, and recommend these important auxiliaries to the careful consideration of every Patron.

We also recommend the adoption of the resolution offered by Brother James Davis, in regard to instructing the district deputies in the unwritten work.

Again do not let the purely social element so far predominate among us as to eclipse the main object of our organization. We believe that there is danger of this. Many an organization has run into this and from this into nothingness. Further, let us try to bring the attention of others to our beloved order and the truths it teaches.

M. F. Hill, chairman of committee on Publications, reported as follows:

REPORT OF COMMITTEE ON PUBLICATIONS.

BY M. F. HILL.

Worthy Master, Brothers and Sisters:

On receiving notice of my appointment as chairman of this committee, and realizing the importance of the subject to be

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treated, a sense of my inability to do it justice almost forced me to decline the honor which attaches itself to the proper performance of the duties of the office, but remembering that our watchword is "try," concluded to do so.

Knowing that brevity is essential, I will commence by saying, what all admit, that in proportion to the intelligence possessed by a man or body of men will their success be measured. And here we would remind every Patron that we have been placed under very great obligations to members of the press and publishers of papers for the generous support accorded us by allowing us the free use of their columns, as well as the many proofs of their interest in the prosperity of our order.

We realize that our success has been largely due to this cause, and in return for such consideration we should lend them our cordial support and patronage.

Our worthy master in his report alludes to the importance of the press and publications as mighty factors in our work.

We fear that we often err in the selection of reading for ourselves and families, as there are so many papers from which to select. Perhaps it will not be out of place to mention a few of those which are doing a great and noble work for us, and in return should receive our support. The "Grange Homes" is supplying a need long felt as an advocate of our views as well as an honest exponent of right principles and true Grange doctrines.

Another, the "American Grange Bulletin," commends itself to all true Patrons by its manly and fearless advocacy of the right, regardless of consequences.

And yet another claims our attention. "Farm and Home" is an old favorite of the farmer's family and seems even better as it grows older.

And last, though not least only in price, will mention the "Farm Journal," published by our old friend Atkinson, dealing its stout blows for right against might.

Then at our very doors we have the "People and Patriot" and "Statesman," at Concord, the "Union" and "Mirror,"

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of Manchester; all have come to be a household word in the farmer's family.

The above are only a few of the friends who have espoused the cause of the farmer and can rightly claim a share of the benefits resulting from our success.

And here let us remind you that all the above papers open their columns and invite all to write something of their own views on reports of farm operations, which will help to make the paper better and at the same time help to interest ourselves in all that tends to make life on the farm pleasant and profitable.

Taxation is, and will continue to be, a question of vast importance to our order, and we heartily endorse the action of the special committee.

We do not claim that we have been subjected to intentional wrong, but that while all other interests have been guarded, ours has been left, as it had no one to care for it, and the only blame we can place on them is that they have exemplified the first laws of nature regardless of the consequences to us.

As long as we have the power in our own hands to place agriculture on equal footing with the other great interests and fail to do so, we are subjecting ourselves to the ridicule of our opponents, and forging chains with which to bind our posterity to a fate even worse than our own.

As to the means by which we may be enabled to hold our own in the business world, none are so potent as the printed page, and, indeed, were it not for this, we should almost despair of ever having the ability to cope with the powers against us.

Let us, therefore, fit ourselves for the work before us by storing well our minds with such information as will be of use to us in the higher sphere opened to us through the influence of the Grange and kindred organizations.

We should bear in mind that we have less excuse than our fathers had for practicing a slipshod way of farming, as we are within reach of all the requisites to help us in our life work.

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And again let me urge every Patron to lend his or her hearty support to all that tends to educate the masses, not only in agricultural lore, but in all the occupations which support our great and teeming population.

We feel it our duty to encourage every effort to extend the right of suffrage to the women of our country and will hail with joy the day when we shall welcome them, not only to our voting places, but to our halls of legislation as well.

In support of the above, allow me to mention a statement recorded by one of the greatest financiers known to our country, who had the oversight of the thousands of women employed in the treasury department, that not one cent was lost to the country through the dishonesty of a woman.

Before closing, allow me to express the hope that we shall strive continually to store our minds with knowledge, believing that therein lies our strength; as the times call for *vigorous* action, we enjoin all to work who never worked before, and all that have worked to work the more, and I will add a few lines which seem to voice my feelings in regard to our duty in this matter of such vital importance to all:

"Men and brethren, up, be doing,
Help each other by the way.
Aid with heart and hand the dawning
Of a great and glorious day.

Think not earth has fixed teachers,
Progress centered in the few.
All men, more or less, are missioned,
Each one hath a part to do.

Let no heart be found to tarry,
Holy impulse bear you through,
All men, more or less, are missioned,
Each one hath a part to do."

The report of the committee on Dormant Granges prepared by W. U. Carlton, chairman of the committee was read by the secretary:

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REPORT OF COMMITTEE ON DORMANT GRANGES.

Worthy Master and Patrons:

The fact that you have a committee on Dormant Granges presupposes that there are such within the jurisdiction of this State Grange. After hearing the report of the secretary, deputies, and masters, one would be led to think that the appointment of such a committee was unnecessary, but alas, this is not the case. On inquiry, your committee find, we are sorry to say, a *few*, a very few Granges within our great Grange family, that are in this dormant or inactive condition — not dead but sleeping. We also learn that there are several that are dead, literally dead. In consideration of this fact your committee would make the following report:

We find, by the report of the committee on this subject in the preceding years, that the ground has been so thoroughly canvassed, and suggestions so judiciously and carefully made, that but little in that line remains to be done.

Your committee find on investigation that the few Granges that are dormant and those that are dead are not of recent organization, all were instituted before the year 1878, when the financial feature was the leading object; and their light grew dim or went entirely out as soon as that bubble burst. If our order was the only one that had these dormant members, we might well be alarmed and think the fault to be in the order itself; but an order based on such principles as ours, viz., faith, hope, charity, and fidelity, *cannot* reach such a condition unless wronged or neglected. We believe the great or leading cause of this dormancy is selfishness, a desire to be continually receiving good without dispensing it to others, being helped but not willing to help; a foul pond is one that has no outlet. Too many join the Grange simply to be entertained, with no intention or desire to help in the entertainment and benefiting of others.

Some have the "almighty dollar" so firmly implanted in their hearts that there is no room for the good things that the

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Grange offers. There are too many of those so called beneficial orders where one can get, they say, $500, $100, or $1,000 by paying only a few dollars, but experience has always taught that it is impossible to get something out of nothing; whatever one gains some one else loses.

The majority of Granges that are reported weak, are those in our small country towns, where to us it seems that the Grange should take the strongest hold; why this is so, we are unable to discover, except it be that the people are not yet educated up to the demands of the times and are ignorant of the fact that the Grange supplies this education. We are aware that the ever increasing number of other orders and organizations being instituted in all our larger towns, hinder, in a measure, the growth of the Grange, as there is a tendency to try every new thing.

The Grange must keep up to the times in all its work if it would hold its own with its competitors. No order has a higher motive or does a better work than ours, and we believe, with proper and persistent efforts, some of the weak Granges may be strengthened and awakened to newness of life and activity. We would suggest that some good speaker, with the ability and love for the work that Mr. Whitehead possessed, be engaged to visit such Granges, and by his energy, influence, and help, inject into them the "elixir" of life that shall once more put them on their feet and start them on the road to success.

If this is impossible, let the deputy, with some other good, live brother or sister, visit, enliven, and encourage them as the principles of our order demand. We also most heartily recommend frequent visits of neighboring Granges. Some Granges find a source of a great deal of pleasure and profit in surprises, going in a body and taking their lunch baskets with them, and thus affording their friends and themselves a most enjoyable picnic even in the winter evenings.

Care should be taken in the selection of officers; elect those that are qualified, have an interest in the work, and are willing to work. Do not elect any to office merely to draw them to

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the Grange, first let them show themselves worthy of such confidence. The young people should be invited to come in and extra exertions made to induce them to abide with us; when they come, work should be given them to do, and do not be afraid of letting them have a good time, for on them, very soon, will the success of our order depend, and if they feel that they are useful and appreciated they will be sure to be interested and add much to the life of the Grange.

Work, in proper amount, seems to be the great panacea, not only by the officers but by the individual members; to gain strength in Grange, as well as physical life, no fruit is so delicious as that we have helped to procure. A few "Quaker meetings" will work injury and their effects cannot but be felt.

While we urge that efforts be made to revive our weak Granges, still, if a Grange has been allowed to decline and fall through sheer indifference among its members, we think the efforts needed to bring it to life and activity might better be expended in working in new fields and in organizing new Granges.

We suggest that state officers and deputies be awake to first indications of decline and take immediate steps to strengthen and help. It is a great deal easier to administer restoratives than to resurrect when life is extinct.

Report of committee on Music was presented by F. W. Prichard, chairman.

REPORT OF COMMITTEE ON MUSIC.

BY F. W. PRICHARD.

Worthy Master and Patrons:

There is nothing more essential to the growth and pleasure of the Grange than music; therefore,

Resolved, That it is for the interest of the Grange, State, Pomona and Subordinate, to have some better system or arrangement for

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music in their meetings. Therefore your committee would recommend that the master and lecturer of each Grange have at each meeting a committee on Music, appointed to furnish either vocal or instrumental music for the next meeting; also, encourage each member of the order to assist in this part of the entertainment and all members that can sing to take part in the opening and closing songs; also,

Resolved, That the local Grange furnish music at all Pomona meetings.

Report of the committee on Constitutional Amendment and By-Laws was presented by Oliver Drake, chairman.

A vote of thanks was extended to the newspapers for reports of the session; to the railroads and hotels for reduced rates; to the city of Manchester for use of the City hall, and to various persons who had contributed to the furnishing and decorating of the hall for the meeting. J. S. Freeman offered the following, which was adopted:

Resolved, That the worthy master appoint a committee of three to visit the Agricultural college and Experiment Station, and report at the next session of the State Grange; also, a committee of three on Woman's Work in the Grange.

In accordance with the foregoing resolution, the worthy master appointed the following committee to visit the Agricultural college and Experiment Station: S. F. Merrill, Keene; George Farr, Littleton; W. U. Carlton, Goffstown.

On Woman's Work. — A. G. Marshall, Dunbarton; Annie E. Hutchinson, Milford; R. P. Davis, Gilsum.

Master McDaniel announced the following list of deputies:

General Deputy. — Emri C. Hutchinson, Milford.

Special Deputy. — Nahum J. Bachelder, East Andover.

District Deputies. — No. 1, George R. Drake, Manchester; No. 2, F. P. Wentworth, Rochester; No. 3, T. E. Hunt, Lake Village; No. 4, J. P. Blodgett, Hebron; No. 5, J. C. Morrison, Boscawen; No. 6, J. M. Carr, Wilmot Flat; No. 7, F. W. Prichard, New Ipswich; No. 8, T. H. White, Harrisville; No. 9, C. H. Rockwood, Swanzey; No. 10,

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C. P. Farley, Bedford; No. 11, C. H. Dutton, Bennington; No. 12, L. L. Cutts, Newport; No. 13, J. S. Freeman, Lebanon; No. 14, William Harriman, Littleton; No. 15, Alonzo Towle, Freedom.

No further business appearing, the Grange was closed in due form at 4.30 o'clock.

N. J. BACHELDER,
Secretary.

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LIST OF SUBORDINATE GRANGES AND THEIR OFFICERS, 1891.

No.	NAME.	LOCATION.	MASTER.	LECTURER.	SECRETARY.
1	Gilman.	Exeter.	John J. Bell.	C. W. Treadwell.	John D. Lyman.
4	Merrimack River.	Canterbury.	Lowell T. Mason.	Miss Lizzie F. Houser.	Miss Bertha E. Morrill.
5	Lovell.	Washington.	S. W. Hurd.	Mrs. Clara M. Hurd.	Mrs. Ida M. Brockway.
7	Granite.	Milford.	William S. Keith.	Miss Anna L. Colburn.	George W. Colburn.
8	Sullivan.	Newport.	Bela Graves.	George F. Whitney.	George W. Hurd.
9	Claremont.	Claremont.	Erastus C. Bailey.	Miss Anna L. Lewis.	Ora D. Blanchard.
10	Souhegan.	Amherst.	Harry A. Wilkins.	Mrs. Viola R. Dodge.	Henry C. Day.
11	Hudson.	Hudson.	Kimball Webster.	George H. Abbott.	Miss Gertie A. Merrill.
12	Hollis.	Hollis.	Roger Paull.	Mrs. Clara H. Marshall.	W. L. Marshall.
13	Nashua.	Nashua.	John L. H. Marshal.	Elijah A. Robins.	Mrs. Fannie A. Murch.
18	Pinnacle.	Lyndeborough.	William C. Wilder.	Mrs. S. Kate Swinington.	John H. Goodrich.
19	Cold River.	Acworth.	Isaac Newton.	Miss M. J. Dickey.	Henry A. Clark.
20	Advance.	Wilton.	Stanley H. Abbott.	Willis H. Abbott.	Mrs. A. D. Abbott.
21	Prospect.	Mt. Vernon.	William H. Kendall.	Miss Eunice A. Fox.	Mrs. Annie E. Perham.
23	Greenfield.	Greenfield.	David Starett.	Mrs. J. Fletcher.	D. W. Burnham.
25	Cornish.	Cornish.	James W. Fitch.	Herbert Deming.	Mrs. Albert Weld.
31	Thornton.	Merrimack.	John G. Read.	Mrs. Cynthia A. Platts.	Miss Harriette McGilvary.
32	Oak Hill.	Francestown.	George D. Epps.	Edson H. Patch.	Emma J. Duncklee.
33	John Hancock.	Hancock.	Fred M. Davis.	A. Clifton Ware.	Miss Ella C. Ware.
34	Miller.	Temple.	Herbert O. Hadley.	Miss Helen M. Hadley.	George F. Barker.
35	Peterborough.	Peterborough.	Milton E. Osborn.	Mrs. E. Maria Hadley.	Mrs. Elsie E. Hunt.
36	Watatic.	New Ipswich.	F. W. Prichard.	E. O. Marshall.	C. A. Preston.
37	Nutfield.	Derry.	Alvin J. Seavey.	Horace A. Hill.	Mrs. Lizzie F. Hill.
39	Bear Hill.	Henniker.	Arthur C. Graves.	Miss Julia A. Flanders.	Mrs. Charlotte A. Wilkins.
40	Uncanoonuc.	Goffstown.	William U. Carlton.	George Pattee.	Fred K. Hazen.
41	Wolf Hill.	Deering.	Dennis R. Chase.	Mrs. Calista J. Wilkins.	Mrs. Lizzie G. Locke.
42	Stark.	Dunbarton.	George F. Mills.	Mrs. A. G. Marshall.	Miss Ethelyn L. Jameson.
44	Londonderry.	Londonderry.	James G. Stone.	Mrs. Laura S. Dickey.	Henry J. Caldwell.

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46	Narrangansett.	Bedford.	William F. Connor.	Mrs. Mary A. Gove.	Edward W. Stevens.
47	Warren Pond.	Alstead.	J. F. Dickey.	Mrs. Ira P. Smith.	Mrs. C. D. Smith.
48	Lancaster.	Lancaster.	Fred H. Clough.	Mrs. Louise E. Hartford.	W. R. Stockwell.
49	Monroe.	Monroe.	F. A. Blodgett.	W. I. Fisher.	R. A. Moore.
50	White Mountain.	Littleton.	C. W. Bedell.	George Walker.	Leslie F. Bean.
51	Winnipesaukee.	Meredith.	Fred H. Smith.	Arthur J. Mead.	Daniel L. Alexandria.
52	Mount Belknap.	Gilford.	Almon L. Sanborn.	Miss Isa M. Sanborn.	Perry E. Hunt.
53	Joe English.	New Boston.	George A. Wason.	Mrs. Mabel Buchanan.	Charles F. Marden.
54	Wyoming.	South Weare.	Almus W. Morse.	Eben L. Paige.	Mrs. Emma W. Nichols.
55	Ammonoosuc.	Bath.	M. R. Tewksbury.	John A. Noyes.	Dennis Lawson.
56	Union.	Hopkinton.	Robert T. Gould.	Mrs. Emma A. Foss.	Mrs. Catherine S. Connor.
58	Bradford.	Bradford.	J. Merrill.	Mrs. Eliza A. Merrill.	Mrs. Helen H. W. Felch.
60	Grafton Star.	Hanover.	C. H. Pettee.	G. W. Tarleton.	Miss C. C. Warden.
62	Morning Star.	Lyme.	Frank G. Whittemore.	Mrs. George P. Amsden.	George S. Mayo.
63	Valley.	Hillsborough.	John Goodale.	Miss Jennie Vickery.	Mark M. Hadley.
65	Crown Point.	Strafford Corner.	David H. Tufts.	Frank B. Yeaton.	Charles F. Foss.
68	Mascoma.	West Canaan.	David Noyes.	Julia A. Dwinels.	Ruth K. Jones.
69	Eureka.	Grafton.	George E. Whitford.	George S. Barney.	B. Franklin Williams.
70	Mont Calm.	Enfield.	Charles McDaniel.	George F. Pettengill.	Amos M. Bryant.
71	Blazing Star.	Danbury.	Kendrick S. Bullock.	Miss DeEtte L. Bullock.	Frank L. Taylor.
72	Indian River.	Canaan.	Alvin Davis.	C. O. Barney.	A. M. Shackford.
74	Deerfield.	Deerfield.	John L. Stevens.	Miss Alice J. Dearborn.	Arthur M. Chase.
77	Mount Hope.	Landaff.	John E. Hall.	Mrs. John E. Hall.	W. E. Clark.
79	Olive Branch.	Hebron.	George B. Barnard.	Hiram Worthley.	Ellen E. Rogers.
80	Bow Lake.	Strafford.	William A. Brown.	D. S. Woodman.	J. F. Hanson.
81	Cocheco.	Dover.	Hiram S. Osborn.	Mrs. L. P. Wentworth.	James M. Hayes.
83	Spafford.	(West) Chesterfield.	Rev. Hiram B. Morgan.	Mrs. Lenna S. Brown.	H. G. Smith.
86	Rochester.	Rochester.	Alvah E. Otis.	Frank P. Wentworth.	J. A. Corson.
87	Kearsarge.	Wilmot.	Fred W. Roby.	Mrs. Louisa M. Nelson.	Fred E. Longley.
88	Highland Lake.	Andover.	F. H. Flanders.	G. H. Haley.	Mrs. E. M. Tuttle.
90	Warner.	Warner.	Walter M. Flanders.	Miss Sarah Davis.	Miss Jennie S. Perry.
91	Sutton.	Sutton.	William H. Chadwick.	Mrs. Eliza L. Fowler.	Daniel L. Powers.
93	Campton.	Campton.	Thomas S. Pulsifer.	Walter H. Dow.	Mrs. Almira H. Merrill.

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LIST OF SUBORDINATE GRANGES AND THEIR OFFICERS, 1891. — *Continued.*

No.	Name.	Location.	Master.	Lecturer.	Secretary.
94	Ezekiel Webster.	Boscawen.	George W. Fisher.	Mrs. Elvira P. Carter.	William P. Abbott.
95	New London.	New London.	Willie M. Knowlton.	Mrs. Lucia N. Shepard.	Edgar F. Sargent.
96	Forest.	Stoddard.	Albert B. Reed.	Miss Emma E. Cutter.	Miss E. E. Griffiths.
97	Catamount.	Pittsfield.	S. N. Lougee.	Mrs. Effie M. Sanborn.	Natt A. Cram.
98	Antrim.	Antrim.	George T. Buchanan.	Mrs. Nellie M. Hills.	W. C. Hills.
99	Harmony.	Sanbornton.	George H. Wadleigh.	Freeman D. Gilman.	George C. Ward.
100	Daniel Webster.	Webster.	Frank A. Lang.	Mrs. Mary C. Wadleigh.	Miss Annie P. Wadleigh.
101	Crystal Lake.	Gilmanton.	Frank T. Collins.	Luther E. Page.	Miss Harriet B. Cogswell.
102	McClary.	Epsom.	James H. Tripp.	Miss May E. Dolbeer.	Miss Annie M. Tripp.
103	Monadnock.	Dublin.	Fred C. Gowing.	Rev. George W. Patten.	Miss Sarah F. Townsend.
104	Bartlett.	Salisbury.	George P. Titcomb.	Charles A. Green.	John W. Folsom.
105	Silver Lake.	Harrisville.	Martin M. Mason.	Mrs. Anna M. Phelps.	Mrs. Mary F. Parker.
106	Fruitdale.	Mason.	Edwin S. Spalding.	George L. Blood.	Miss N. F. Thompson.
107	Pemigewasset.	Hill.	Henry P. Blake.	Frank R. Woodward.	Joseph W. Favor.
108	Franklin.	Franklin.	Elmer D. Kelley.	Lizzie A. Brockway.	Emma Burleigh.
109	Rumford.	East Concord.	John G. Tallant.	Miss Eulalia M. Lyle.	Frank P. Curtis.
110	Friendship.	Northfield.	Edwin D. Forrest.	Miss Annie F. Lane.	Miss Kate Forrest.
111	Pembroke.	Pembroke.	Charles A. Gile.	Charles B. Rogers.	Frank T. Cheney.
112	Sunapee Lake.	Newbury.	Virgil C. Brockway.	John D. Folsom.	Willis E. Muzzey.
113	Capital.	Concord.	Joseph E. Shepard.	Miss Mary E. Ballard.	Miss Lizzie Stokes.
114	Golden Rod.	Swanzey.	Marcus C. Stone.	George Carpenter.	C. H. Rockwood.
115	Granite Lake.	Nelson.	Frank B. Hardy.	Mrs. Rose M. Barker.	Cummings B. McClure.
116	Mt. Washington.	Whitefield.	William H. Parker.	Mrs. J. A. Goodwin.	Mrs. C. E. King.
117	Lawrence.	Belmont.	E. G. Ladd.	Mrs. J. P. Cilley.	Mrs. Hattie A. Lamprey.
118	Marlborough.	Marlborough.	George L. Capron.	J. K. Southwick.	Almon C. Mason.
119	Barnstead.	Barnstead.	George W. Dow	Charles F. Davis.	Mrs. Calista M. Downs.
120	Laconia.	Laconia.	J. Frank Crockett.	Mrs. Eva Z. Sargent.	Leroy J. Severance
121	Loudon Surprise.	Loudon.	Rinaldo B. Foster.	George W. Rowell.	Clara A. Mudgett.

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122	Scammell.	Durham.	Lucien Thompson.	Miss Mamie E. Young.	T. W. Schoonmaker.
123	New Hampton.	New Hampton.	M. H. Merrow.	Miss Minnie M. Swain.	Mrs. Ella R. Merrow.
124	Star King.	Jefferson.	Lyman D. Kenison.	Mrs. Mary F. Applebee.	James G. Summers.
125	Walpole.	Walpole.	Charles H Barnes.	Mrs. H. J. Watkins.	A. Dwinwell.
126	Lebanon.	Lebanon.	Fred P. Hatch.	Mrs. Cynthia Perley.	Mrs. Mary J. Berry.
127	Massabesic.	Auburn.	Henry C. Sanborn.	Willard H. Griffin.	Alfred D. Emery.
128	Lake Shore.	Wolfeborough.	Levi T. Haley.	Greenleaf B. Clark.	Jonas W. Piper.
129	Ashuelot	Gilsum.	W. S. Mansfield.	Mrs Fannie Smith.	Mrs. Carrie M. Kidder.
130	Ossipee Mountain.	Tuftonborough.	Charles J. Burleigh.	Albert A. Bertwell.	Mrs. Julia F. Pray.
131	Cheshire.	Keene.	Ellery E. Rugg.	Mrs. Maria J. Randall.	Solomon F. Merrill.
132	Chichester.	Chichester.	J. Frank Towle.	Oliver Drake.	N. D. Fitts.
133	Wantastiquet.	Hinsdale.	George P. Slate.	L. Frank Liscom.	Mrs. L. Janette Davis.
134	Marshall P. Wilder.	Rindge.	A. W. Gibson.	Jason S. Perry.	Martin L. Goddard.
135	Jaffrey.	Jaffrey.	W. J. Mower.	E. R. Spaulding.	Mrs. S. H. Chamberlain.
136	Excelsior.	Marlow.	James M. Perkins.	Warren M. Davis.	Mrs. Perley E. Fox.
137	Riverside.	Dalton.	Bert A. Taylor.	Mrs. Etta Cushman.	W. L. Johnson.
138	Great Meadow.	Westmoreland.	Clement L. Mansfield.	James A. Craig.	George J. Bennett.
136	Arlington.	Winchester.	Harvey Jewell.	W. E. Johnson.	S. M. Morse.
140	Freedom.	Freedom.	Stephen W. Fowler.	Alonzo G. Fowler.	John E. Perkins.
141	Amoskeag.	Manchester.	E. J. Burnham.	Scott W. Lane.	O. H. Leavitt.
142	Tuftonborough.	Tuftonborough.	Robert Lamprey	James A. Bennett.	Elbridge D. Copp.
143	Atkinson.	Atkinson.	Herman Noyes.	Truman B. Rice.	George E. Emerson.
144	Sunapee.	Goshen.	Elias W. Pike.	Jessial P. Gove.	Mrs. Stephen D. Moxham.
145	Pistareen.	Chesterfield.	Winslow A. Pattridge.	Mrs. Ella L. Pierce.	Frank C. Hamilton.
146	Pequawket.	Conway.	John L. Pendexter.	Joseph L. Binford.	James W. Whitaker.
147	Richmond.	Richmond.	Almon Twitchell.	Mrs. Cora F. Martin.	Mrs. Lucy J. Freeman.
148	Hooksett.	Hooksett.	Warren Saltmarsh.	Arthur Kimball.	C. E. Nutting.
149	Granite State.	Newton.	Ezra N. George.	Miss Kate Dalton.	Irving M. Heath.
150	Junior.	Goffstown.	G. F. Farley.	D. G. Roberts.	Miss Carrie A. Tirrell.
151	Meriden.	Plainfield.	Josiah Davis.	Mrs. Marion Eastman.	Mrs. Hattie A. Hilliard.
152	Blackwater.	Andover.	George W. Stone.	Wendall P. Elkins.	Nathan Woodbury.
153	Honor Bright.	Sullivan.	Charles W. Buckminster.	O. H. Woodbury.	Mrs. Rue Fifield.
154	Fitzwilliam.	Fitzwilliam.	Timothy Blodgett.	Stephen A. Taylor.	D. F. White.

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LIST OF SUBORDINATE GRANGES AND THEIR OFFICERS, 1891. — *Continued.*

No.	Name.	Location.	Master.	Lecturer.	Secretary.
155	Merry Meeting.	Alton.	Charles H. Downing.	Miss Mary E. Avery.	Mrs. P. H. Wheeler.
156	Surry.	Surry.	William H. Porter.	Mary E. Field.	John A. Weber.
157	Trojan.	Troy.	Henry M. Whittemore.	Charles W. Brown.	George W. Mason.
158	Mt. Israel.	Sandwich.	B. F. Fellows.	C. B. Hoyt.	E. W. Hodsdon.
159	Lincoln.	West Swanzey.	Park E. Wright.	James E. Handy.	Herbert O. Young.
160	Carroll.	Ossipee.	A. J. Hamm.	Lizzie L. Farnham.	J. C. Ames.
161	Jeremiah Smith.	Lee.	B. Frank Davis.	Frank J. Smith.	Horace F. Caverno.
162	Newfound Lake.	Bristol.	Calvin Martin.	George D. Judkins.	Woodbury Sleeper.
163	Hampstead.	Hampstead.	John C. Sanborn.	Mrs. E. L. Spinney.	Mrs. Albert H. Little.
164	Crescent Lake.	Barnstead.	William H. Berry.	Mrs. A. E. Chamberlain.	Lenore J. Holmes.

LIST OF POMONA GRANGES AND THEIR OFFICERS, 1891.

No.	Name.	Location.	Master.	Lecturer.	Secretary.
1	Hillsborough County.	Milford.	Elbridge K. Jewett.	Mrs. E. C. Curtis.	D. G. Roberts.
2	Eastern New Hamp.	Bow Lake, Strafford.	James H. Hayes.	Lucien Thompson.	Charles F. Foss.
3	Merrimack County.	Concord.	W. W. Burbank.	H H. Metcalf.	Mrs. Caroline F. Emery.
4	Belknap County.	Laconia.	Thomas E. Hunt.	Fred Smith.	Miss Millie F. Weeks.
5	Northern New Hamp.	Littleton.	George Farr.	Charles L. Clay.	George E. Walker.
6	Cheshire County.	Keene.	James Burnap.	Thomas E. White.	Mrs. Ella J. Farwell.
7	Mascoma Valley.	Lebanon.	Charles McDaniel.	Herbert L. Webster.	Alvin Davis.
8	Carroll County.	Ossipee.	Alonzo Towle.	C. E. Blanchard.	James A. Bennett.

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NEW HAMPSHIRE GRANGE FAIR.

SECRETARY'S REPORT.

OFFICERS FOR 1891.

W. W. BURBANK, *President* . . .	Webster.
WARREN TRIPP, *Vice-President* . .	Epsom.
G. H. WADLEIGH, *Treasurer* . . .	Tilton.
N. J. BACHELDER, *Secretary* . . .	Andover.

EXECUTIVE COMMITTEE.

W. F. DANIELL	Franklin.
A. R. AYERS	Concord.
J. C. MORRISON	Boscawen.

DIRECTORS.

John D. Lyman, Exeter.	Alfred H. Colby, Tilton.
George F. Blanchard, Canterbury.	Daniel G. Holmes, Webster.
Mark F. Hill, Washington.	J. W. Cogswell, Gilmanton.
Jason T. Burns, Milford.	Warren Tripp, Epsom.
Bela Graves, Unity.	John E. Baldwin, Dublin.
Milton P. Bailey, Claremont.	John Shaw, Salisbury.
C. L. Trow, Amherst.	Benjamin Willard, Dublin.
Aldon E. Cummings, Hudson.	Veron Eaton, Mason.
L. M. Swallow, Hollis.	Frank R. Woodward, Hill.
Elijah A. Robbins, Nashua.	J. G. Clark, Franklin.
Andy Holt, Lyndeborough.	John B. Sanborn, Concord.
Abram M. Mitchell, Acworth.	Daniel S. Clay, Tilton.
Charles White, Wilton.	Frank T. Cheney, Pembroke.
Frank O. Lamson, Mt. Vernon.	Nathan B. Bly, Newbury.

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Albert Weld, Cornish.
E. E. Parker, Merrimack.
Henry Richardson, Francestown.
Charles H. Dutton, Bennington.
Dewitt C. Bragdon, Wilton.
Albert C. Frost, Peterborough.
Edgar F. Sawyer, New Ipswich.
Albert A. Pressey, Derry.
Joseph Wood, Henniker.
Henry Moore, Goffstown.
Alvin Tubbs, Deering.
Horace Caldwell, Dunbarton.
James G. Stone, Londonderry.
Ezra C. Barnes, Manchester.
Frank Forristall, Alstead.
Zeb Twitchell, Lancaster.
F. H. Cross, Monroe.
Charles R. Allen, Littleton.
George F. Smith, Meredith.
Jewell Gove, Gilford.
William Woodbury, New Boston.
George Simons, Weare.
E. A. Rodiman, Bath.
J. M. Connor, Hopkinton.
C. H. Morrill, Bradford.
D. S. Bridgman, Hanover.
Charles H. Dimick, Lyme.
Edwin W. Gay, Hillsborough.
S. B. Jenness, Strafford.
Fred G. Richardson, Canaan.
Arthur M. Powers, Grafton.
F. B. Morse, Enfield.
Frederic Huntoon, Danbury.
A. M. Shackford, Canaan.
Horace C. Silver, Deerfield.
John E. Hall, Lisbon.
David P. Hardy, Hebron.
Daniel S. Woodman, Strafford.
William T. Wentworth, Dover.
William E. Davis, Chesterfield.

A. R. Ayers, Concord.
Charles R. Worcester, Swanzey.
Thaddeus W. Barker, Nelson.
L. J. Miner, Whitefield.
Howard B. Holman, Tilton.
Charles Mason, Marlborough.
C. F. Davis, Barnstead.
S. J. P. Hadley, Laconia.
George M. Munsey, Chichester.
Stephen P. Chesley, Durham.
Martin Woodman, Meredith.
Manassa Perkins, Jefferson.
George W. Stanley, Langdon.
Charles P. Freeman, Lebanon.
Willard H. Griffin, Auburn.
George F. Horne, Wolfeborough.
George E. Newman, Gilsum.
Charles H. Brown, Ossipee.
Henry W. Nims, Keene.
John F. French, Chichester.
S. O. Davenport, Hinsdale.
John J. Hardison, Rindge.
Byron E. Martin, Jaffrey.
James Burnap, Marlow.
Lucius Bond, Dalton.
C. H. Cobb, Westmoreland.
A. Warren Swan, Winchester.
Frank C. Tyler, Freedom.
R. D. Gay, Manchester.
George W. Copp, Tuftonborough.
Edward N. Greenough, Atkinson.
J. P. Gove, Goshen.
J. W. Scott, Chesterfield.
William D. Tasker, Conway.
Lewis R. Cass, Richmond.
Elroy J. Robie, Hooksett.
Irving M. Heath, Newton.
D. G. Roberts, Goffstown.
Alvah B. Chellis, Meriden.
J. Fred Fellows, Andover.

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George H. Springfield, Rochester.
John M. Carr, Wilmot.
George H. Haley, Andover.
S. W. Shattuck, Warner.
George W. Gage, Sutton.
Walter H. Dow, Campton.
John C. Morrison, Boscawen.
James E. Shepard, New London.
Albert B. Reed, Stoddard.
Sewell N. Lougee, Pittsfield.
George T. Buchanan, Antrim.
Horace R. Fifield, Sullivan.
Gilbert A. Petts, Winchester.
Charles H. Downing, Alton.
John A. Weber, Surry.
Carlos M. Barnard, Troy.
B. F. Fellows, Sandwich.
George O. Capron, Swanzey.
Jas. A. Chute, Ossipee.
B. Frank Davis, Lee.
Z. E. Tilton, Bristol.

The sixth annual exhibition of the New Hampshire Grange Fair Association was held on the Tilton and Franklin Driving Park, Tilton, N. H., September 15, 16, and 17, 1891. Like the preceding exhibitions of this association it was successful in all particulars and received a larger patronage than ever. The following list of premiums will give much information relative to the exhibition:

JERSEY STOCK.

HERD PREMIUMS.

1st, Warren F. Daniell, Franklin.

BULLS.

Three years. — 1st, Warren F. Daniell, Franklin; 2d, Charles W. Emery, Canterbury.

One year. — Fred Goodell, Sanbornton.

COWS.

Four years or over. — 1st, Warren F. Daniell, Franklin; 2d, Charles W. Emery, Canterbury.

HEIFERS.

Three years. — 1st, Warren F. Daniell, Franklin; 2d, Charles W. Emery, Canterbury.

Two years. — 1st, Warren F. Daniell, Franklin.

One year. — W. F. Daniell, Franklin.

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HEIFER CALVES.

1st and 2d, Warren F. Daniell, Franklin.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

HOLSTEINS.

HERD PREMIUMS.

1st, D. H. Goodell, Antrim; 2d, H. B. French, Gaza.

BULLS.

Three years or over. — 1st and 2d, D. H. Goodell, Antrim.
Two years. — 1st, H. B. French, Gaza.
One year. — 1st, D. H. Goodell, Antrim.

BULL CALVES.

1st, H. B. French, Gaza; 2d, D. H. Goodell, Antrim.

COWS.

Four years or over. — 1st and 2d, D. H. Goodell, Antrim.

HEIFERS.

Three years. — 1st, D. H. Goodell, Antrim.
Two years. — 1st, D. H. Goodell, Antrim; 2d, H. B. French, Gaza.
One year. — 1st and 2d, H. B. French, Gaza.

HEIFER CALVES.

1st, D. H. Goodell, Antrim; 2d, H. B. French, Gaza.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

AYRSHIRE.

HERD PREMIUMS.

1st, Andy Holt, South Lyndeborough; 2d, Ansel F. Gove, Gilford Village.

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BULLS.

Three years or over. — 1st, Andy Holt, South Lyndeborough; 2d, Ansel F. Gove, Gilford Village.

BULL CALVES.

1st, Andy Holt, South Lyndeborough.

COWS.

Four years or over. — 1st, Ansel F. Gove, Gilford Village; 2d, Andy Holt, South Lyndeborough.

HEIFERS.

Three years. — 1st, Andy Holt, South Lyndeborough.

Two years. — 1st, Ansel F. Gove, Gilford Village.

One year. — 1st, Andy Holt, South Lyndeborough; 2d, Ansel F. Gove, Gilford Village.

HEIFER CALVES.

1st, Andy Holt, South Lyndeborough; 2d, Ansel F. Gove, Gilford Village.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

SHORT HORNS.

HERD PREMIUMS.

1st, W. C. Wells, Belmont.

BULLS.

Three years or over. — 1st, W. C. Wells, Belmont.

COWS.

Four years or over. — 1st and 2d, W. C. Wells, Belmont.

HEIFERS.

Three years. — 1st and 2d, W. C. Wells, Belmont.

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HEIFER CALVES.

1st, W. C. Wells, Belmont.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

DEVONS.

HERD PREMIUMS.

1st, John B. Sanborn, East Concord; 2d, William Neal, Meredith.

BULLS.

Three years or over. — 1st, John B. Sanborn, East Concord; 2d, C. W. Whicher, Tilton.

Two years. — 1st, William Neal, Meredith.

One year. — 1st, Ward Parker & Son, Reed's Ferry; 2d, John B. Sanborn, East Concord.

BULL CALVES.

1st, John B. Sanborn, East Concord; 2d, Arthur G. Moore, Tilton.

COWS.

Four years or over. — 1st, C. W. Whicher, Tilton; 2d, John B. Sanborn, East Concord.

HEIFERS.

Three years. — 1st, William Neal, Meredith; 2d, Arthur G. Moore, Tilton.

Two years. — 1st, John B. Sanborn, East Concord; 2d, C. W. Whicher, Tilton.

One year. — 1st, Arthur G. Moore, Tilton; 2d, C. W. Whicher, Tilton.

HEIFER CALVES.

1st, William Neal, Meredith; 2d, Ward Parker & Sons, Reed's Ferry.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

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HEREFORDS.

HERD PREMIUMS.

1st, John P. Kimball, Canterbury; 2d, Thomas W. Taylor, Sanbornton.

BULLS.

Three years or over. — 1st, Herbert N. Clay, Laconia; 2d, W. P. Small, Canterbury.

Two years. — 1st, Seth Quimby, Bow.

One year. — 1st, Seth Quimby, Bow.

COWS.

Four years or over. — 1st, Seth Quimby, Bow; 2d, John P. Kimball, Canterbury.

HEIFERS.

Three years. — 1st, Herbert N. Clay, Laconia; 2d, John P. Kimball, Canterbury.

Two years. — 1st, John P. Kimball, Canterbury; 2d, Herbert N. Clay, Laconia.

One year. — 1st, John P. Kimball, Canterbury; 2d, Herbert N. Clay, Laconia.

HEIFER CALVES.

1st, Herbert N. Clay, Laconia; 2d, Thomas W. Taylor, Sanbornton.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

GUERNSEYS.

BULLS.

Two years. — 1st, A. H. Colby, Tilton.

COWS.

Four years or over. — 1st and 2d, A. H. Colby, Tilton.

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HEIFERS.

One year. — 1st, A. H. Colby, Tilton.

HEIFER CALVES.

1st, A. H. Colby, Tilton.

Judges. — T. D. Curtis, A. W. Cheever, J. G. Tallant.

GRADE OR CROSS BREED.

COWS.

Four years or over. — 1st, John L. Kelley, Franklin Falls; 2d, A. H. Colby, Tilton.

HEIFERS.

Three years. — 1st, A. H. Colby, Tilton; 2d, John B. Sanborn, East Concord.

Two years. — 1st, A. H. Colby, Tilton.

One year. — 1st, William Neal, Meredith; 2d, Charles H. Ayers, Northfield.

HEIFER CALVES.

1st, Ansel F. Gove, Gilford Village; 2d, W. H. Neal, Meredith.

COW WITH SHOW OF STOCK.

1st, Arthur G. Moore, Tilton.

Judges. — Oliver Bailey, P. C. Clough, Henry W. Nims.

SWEEPSTAKES.

FOUR COWS OR HEIFERS FOR MILK.

1st, D. H. Goodell, Antrim; 2d, A. H. Colby, Tilton.

FOUR COWS OR HEIFERS FOR BUTTER.

1st, A. H. Colby, Tilton.

Judges. — John G. Tallant, E. B. Merrill.

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GRANGE TEAMS.

OX-TEAMS, SIX PAIRS.

1st, G. F. Smith, Meredith, for Winnipesaukee Grange; 2d, Daniel S. Clay, Tilton, for Friendship Grange; 3d, S. J. P. Hadley, Laconia, for Laconia Grange.

STEER-TEAMS, SIX PAIRS.

1st, S. J. P. Hadley, Laconia, for Laconia Grange.

Judges. — J. E. Shepard, D. W. Rugg, J. M. Carr.

INDIVIDUAL OX-TEAMS, THREE PAIRS.

1st, S. F. and W. H. Wadleigh, Meredith; 2d, J. F. Crockett, Laconia; 3d, J. E. Smith, Tilton.

Judges. — J. E. Shepard, D. W. Rugg, J. M. Carr.

WORKING OXEN AND STEERS.

Five years or over. — 1st, S. F. and W. H. Wadleigh, Meredith; 2d, J. E. Smith, Tilton.

Four years. — 1st, S. F. and W. H. Wadleigh, Meredith; 2d, Jacob Sanborn, Laconia.

Three years. — 1st, Charles O. Copp, Gilford Village; 2d, John Shaw, Salisbury.

Two years. — 1st, J. P. Sanborn, Franklin Falls; 2d, Jacob Sanborn, Laconia.

One year.— 1st, Charles H. Ayers, Northfield Depot; 2d, F. H. Robinson, North Sanbornton.

CALVES.

1st, Ora G. Ladd, Laconia; 2d, Edwin G. Ladd, Laconia.

TRAINED CALVES.

1st, J. B. Calef, Sanbornton; 2d, Edwin G. Ladd, Laconia.

Judges. — Oliver Bailey, P. C. Clough, H. W. Nims.

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PULLING OXEN.

Over six feet ten inches. — 1st, J. F. Crockett, Laconia; 2d, J. F. Leighton, Franklin Falls; 3d, Jacob Sanborn, Laconia.

Under six feet ten inches. — 1st, Byron Shaw, Franklin Falls; 2d, A. G. Moore, Tilton; 3d, Jacob Sanborn, Laconia; 4th, H. W. Libby, East Andover.

PULLING STEERS.

Three years. — 1st, Charles O. Copp, Gilford Village; 2d, Jacob Sanborn, Laconia; 3d, John Shaw, Salisbury.

Two years and under three years. — 1st and 2d, Byron Shaw, Franklin Falls.

1st, (Sweepstakes) D. H. Goodell, Antrim.

Judges. — J. E. Shepard, Charles McDaniel, D. W. Rugg.

HORSES, STANDARD.

STALLIONS, SWEEPSTAKES.

1st, F. L. Gerald, Laconia.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

STALLIONS.

Five years and over. — 1st, F. L. Gerald, Laconia; 2d, C. W. Davis, Dover.

Four years. — 1st, C. W. Davis, Dover; 2d, Isaac W. Bushey, Concord.

Three years. — 1st, F. L. Gerald, Laconia; G. W. Silver, Penacook.

Two years. — 1st, Warren F. Daniell, Franklin; 2d, G. W. Silver, Penacook.

One year. — 1st, Warren F. Daniell, Franklin; 2d, H. P. Shaw, Salisbury Centre.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

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BROOD MARES WITH COLTS.

1st, H. P. Shaw, Salisbury Centre; 2d, A. R. Ayers, North Boscawen.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

GELDINGS, MARES, AND FILLIES.

Three years. — 1st, Warren F. Daniell, Franklin; 2d, H. P. Shaw, Salisbury Centre.

Two years. — 1st, Herbert L. Brown, Canterbury Depot.

One year. — Charles V. Fisher, Penacook.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

HORSES, NON-STANDARD.

STALLIONS.

Five years or over. — 1st, C. G. Blanchard, Concord; 2d, C. W. Cummings, Warren.

Four years. — 1st, A. W. Summer, West Henniker; 2d, C. H. Gordon, Bristol.

Three years. — 1st, George F. Kelley, Lower Gilmanton; 2d, C. G. Blanchard, Concord.

Two years. — 1st, C. J. Chamberlain, Northfield Depot; 2d, C. G. Blanchard, Concord.

Stallions under one year. — 1st, A. R. Ayers, North Boscawen; 2d, Warren F. Daniell, Franklin.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

BROOD MARES WITH SHOW OF COLTS.

1st, A. R. Ayers, North Boscawen; 2d, Warren F. Daniell, Franklin.

GELDINGS, MARES, AND FILLIES.

Four years. — 1st, Fred L. Lee, Derry.

Three years. — 1st, James D. Meader, Newmarket; 2d, W. W. Darrar, Reed's Ferry.

Two years. — 1st, Clyde A. Gile, Tilton; 2d, George W. Hodgdon, New Hampton.

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One year. — 1st, C. W. Davis, Dover; 2d, Herbert N. Clay, Laconia.

Under one year. — 1st, George F. Kelley, Lower Gilmanton; 2d, George P. Chadwick, Boscawen.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

DRAFT STALLIONS.

Five years or over. — 1st, James M. Jackson, Amherst Station.

Two years. — 1st, Charles V. Fisher, Penacook; 2d, A. A. Pressey, East Derry.

Under one year. — 1st, A. A. Pressy, East Derry.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

GENT'S DRIVING HORSES.

Green horses. — 1st, Levi Clark, Pittsfield; 2d, C. H. Gordon, Bristol.

Walking horses. — 1st, Charles V. Fisher, Boscawen; 2d, A. H. Colby, Tilton.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

DRAFT HORSES.

For best pair. — 1st, W. F. Daniell, Franklin; 2d, A. J. Small, Dover.

Judges. — J. E. Shepard, D. W. Rugg, Charles McDaniel.

MATCHED DRIVING HORSES.

1st, W. D. Tuttle, East Andover; 2d, John B. Sanborn, East Concord.

Judges. — T. O. King, Alonzo Towle, C. H. Bowles.

SHEEP.

Long Wooled Sheep (Thoroughbred).

RAMS.

Two years or over. — 1st, Jewell Gove, Gilford Village.

One year and under two. — 1st, Jewell Gove, Gilford Village.

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LAMBS.

1st, Charles O. Copp, Gilford Village; 2d, Jewell Gove, Gilford Village.

EWES.

Two years or over. — 1st, Jewell Gove, Gilford Village; 2d, Charles O. Copp, Gilford Village.

One year. — 1st, Jewell Gove, Gilford Village; 2d, Charles O. Copp, Gilford Village.

LAMBS.

1st, Charles O. Copp, Gilford Village; 2d, Jewell Gove, Gilford Village.

Long Wooled Sheep (Grades).

RAMS.

Two years or over. — 1st, Arthur E. Moore, Tilton; 2d, A. H. Colby, Tilton.

One year. — Arthur G. Moore, Tilton; 2d, Jewell Gove, Gilford Village.

LAMBS.

1st, Jewell Gove, Gilford Village; 2d, Charles O. Copp, Gilford Village.

EWES.

Two years or over. — 1st and 2d, Cyrus Swain, North Sanbornton.

One year. — Jewell Gove, Gilford Village.

LAMBS.

1st, Charles H. Ayers, Northfield Depot; 2d, Arthur G. Moore, Tilton.

Judges. — J. L. Gerrish, C. J. White, Warren Tripp.

South Downs (Thoroughbred).

RAMS.

Two years or over. — 1st, William Neal, Meredith.

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LAMBS.

1st and 2d, William Neal, Meredith.

EWES.

Two years or over. — 1st and 2d, William Neal, Meredith.
One year. — 1st, William Neal, Meredith.

LAMBS.

1st, William Neal, Meredith.

South Downs (Grades).

RAMS.

1st, C. W. Whicher, Tilton.

EWES.

Two years. — 1st, C. W. Whicher, Tilton.

Shropshire Downs (Thoroughbred).

RAMS.

Two years or over. — 1st, Ward Parker & Son, Reed's Ferry; 2d, A. H. Colby, Tilton.
One year. — 1st, John B. Sanborn, East Concord.

LAMBS.

1st, Ward Parker & Son, Reed's Ferry; 2d, John B. Sanborn, East Concord.

EWES.

Three years or over. — 1st, Ward Parker & Son, Reed's Ferry; 2d, John B. Sanborn, East Concord.
One year. — 1st, John B. Sanborn, East Concord.

LAMBS.

1st, Ward Parker & Son, Reed's Ferry; 2d, John B. Sanborn, East Concord.

Shropshire Downs (Grades).

RAM LAMBS.

1st and 2d, Cyrus Swain, North Sanbornton.

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EWES.

One year. — 1st and 2d, Cyrus Swain, North Sanbornton.

LAMBS.

1st, Cyrus Swain, North Sanbornton; 2d, A. H. Colby, Tilton.

Judges. — J. L. Gerrish, C. J. White, Warren Tripp.

SWINE.

BERKSHIRE (THOROUGHBRED).

Boar, over two months. — 1st and 2d, H. O. Mathews, Concord.

Sow, over two months. — 1st and 2d, H. O. Mathews. Concord.

BERKSHIRE (GRADES).

Boar, over six months. — 1st, H. O. Mathews, Concord.

Brood sow, over six months. — 1st, W. H. Neal, Meredith; 2d, John L. Kelley, Franklin Falls.

Boar pigs, over two months. — 1st, W. H. Neal, Meredith.

Sow, over two months. — 1st, H. O. Mathews, Concord; 2d, W. H. Neal, Meredith.

Suckling Pigs. — 1st, John L. Kelley, Franklin Falls.

Judges. — Erastus C. Bailey, W. E. Gay, Jonathan M. Taylor.

POLAND CHINA (THOROUGHBRED).

Boar, over six months. — 1st, H. O. Mathews, Concord.

Sow, over six months. — 1st, H. O. Mathews, Concord.

Boar, over two months. — 1st, H. O. Mathews, Concord.

Sow, over two months. — 1st, H. O. Mathews, Concord.

Judges. — W. E. Gay, Erastus C. Bailey, Jonathan M. Taylor.

CHESTER WHITE (THOROUGHBRED).

Boar, over six months. — 1st, H. O. Mathews, Concord.

Sow, over six months. — 1st, H. O. Mathews, Concord.

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Boar, over two months. — 1st and 2d, H. O. Mathews, Concord.

Sow, over two months. — 1st, H. O. Mathews, Concord; 2d, Charles F. Ayers, Canterbury.

Judges. — Erastus C. Bailey, W. E. Gay, Jonathan M. Taylor.

JERSEY RED (THOROUGHBRED).

Boar over six months. — 1st, C. W. Whicher, Tilton.

Sow, over six months. — 1st and 2d, C. W. Whicher, Tilton.

Litter of pigs. — 1st, C. W. Whicher, Tilton.

Judges. — W. F. Gay, Erastus C. Bailey, Jonathan M. Taylor.

SMALL YORKSHIRE (THOROUGHBRED).

Boar, over six months. — 1st, H. O. Mathews, Concord.

Boar, over two months. — 1st, H. O. Mathews, Concord.

Sow, over two months. — 1st, H. O. Mathews, Concord.

Judges. — Erastus C. Bailey, W. E. Gay, Jonathan M. Taylor.

POULTRY.

LIGHT BRAHMAS.

1st, E. B. Merrill, East Andover; 2d, A. R. Ayers, North Boscawen.

PLYMOUTH ROCKS.

1st, H. B. Holman, East Tilton; 2d, V. M. Sanborn, Franklin Falls.

Chicks. — 1st, W. O. Field, West Concord; 2d, V. M. Sanborn, Franklin Falls.

BROWN LEGHORN.

Chicks. — 1st, Leslie Gordon, Franklin Falls; 2d, W. O. Field, East Concord.

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WYANDOTTES.

1st, Charles H. Foss, Tilton; 2d, Leslie Gordon, Franklin Falls.

BLACK BREASTED RED GAME.

1st, William Neal, Meredith.
Chicks. — 1st, William Neal, Meredith.

SILVER PENCILED HAMBURGS.

1st, J. W. Folsom, Salisbury.
Chicks. — 2d, J. W. Folsom, Salisbury.

SILVER SPANGLED HAMBURGS.

1st, Herlie H. Sanborn, East Concord.

HOUDANS.

Chicks. — 1st, F. C. Bailey, Sanbornton.

WHITE PLYMOUTH ROCKS.

1st and 2d, Frank T. Moore, Goffstown.

PEKIN BANTAMS.

1st, Leslie Gordon, Franklin Falls.

RED PILE.

1st, William Neal, Meredith.

ROWEN DUCKS.

1st, William Neal, Meredith.

PEKIN DUCKS.

1st, W. O. Field, East Concord.

WHITE CRESTED BLACK POLISH.

1st, F. C. Bailey, Sanbornton.

GUINEA FOWLS.

1st, Frank T. Hersey, Tilton; 2d, W. H. Neal, Meredith.

Judge. — H. W. Hilson

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FRUIT.

Apples.

General exhibit. — 1st, George Simons, Weare; 2d, C. C. Shaw, Milford.

FALL APPLES.

Five varieties. — J. Y. Jewett, Lake Village; 2d, C. C. Shaw, Milford.

WINTER APPLES.

Five varieties. — 1st, Albert A. Bertwell, Ossipee; 2d, George Simons, Weare.

RED ASTRACHAN.

1st, George Simons, Weare; 2d, V. M. Sanborn, Franklin Falls.

EARLY HARVEST.

2d, George Simons, Weare.

TETOFSKY.

1st, George Simons, Weare.

SWEET BOUGH.

1st, T. S. Pulsifer, Campton; 2d, V. M. Sanborn, Franklin Falls.

PORTER.

1st, J. Y. Jewett, Lake Village; 2d, Ned Dearborn, Tilton.

TWENTY OUNCE.

1st, G. F. Smith, Meredith; 2d, George Simons, Weare.

GRAVENSTEIN.

1st, C. C. Shaw, Milford; 2d, George Simons, Weare.

MAIDEN'S BLUSH.

1st, Ellen S. Shaw, Franklin Falls; 2d, A. Woodbury, Goffstown Centre.

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FAMEUSE.

1st, George Simons, Weare; 2d, M. H. Merrow, New Hampton.

BLUE PEARMAIN.

1st, George W. Dearborn, Hill; 2d, Daniel S. Clay, Tilton.

GOLDEN SWEET.

1st, James W. Foss, Rochester; 2d, N. C. Sanborn, Rochester.

GRANITE BEAUTY.

1st, George Simons, Weare.

LADY'S SWEET.

1st, H. B. Sanborn, Webster; 2d, G. F. Smith, Meredith.

TALMAN'S SWEET.

1st, V. M. Sanborn, Franklin Falls; 2d, George Dearborn, Hill.

DUCHESS OF OLDENBURG.

1st, F. G. Hersey, East Andover; 2d, J. Y. Jewett, Lake Village.

WILLIAM'S FAVORITE.

1st, J. Y. Jewett, Lake Village; 2d, G. F. Smith, Meredith.

BALDWIN.

1st, Albert A. Bertwell, Ossipee; 2d, C. C. Shaw, Milford.

RHODE ISLAND GREENING.

1st, G. F. Smith, Meredith; 2d, Albert A. Bertwell, Ossipee.

NORTHERN SPY.

1st, G. F. Smith, Meredith; 2d, H. B. Sanborn, Webster

HUBBARDSTON NONESUCH.

1st, C. C. Shaw, Milford; 2d, George Simons, Weare.

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BEN DAVIS.

1st, C. F. Davis, Barnstead; 2d, James W. Foss, Rochester.

KING OF TOMPKINS COUNTY.

1st, Albert A. Bertwell, Ossipee; 2d, George W. Dearborn, Hill.

ROXBURY RUSSET.

1st, Byron Shaw, Franklin Falls; 2d, G. F. Smith, Meredith.

NODHEAD.

1st, Ellen S. Shaw, Northfield; 2d, G. H. Wadleigh, Tilton.

GILLIFLOWER.

1st. George Simons, Weare; 2d, G. F. Smith, Meredith.

MCINTOSH RED.

1st, A. H. Colby, Tilton.

SHAW.

1st, C. C. Shaw, Milford.

FALLAWATER.

1st, D. G. Roberts, Goffstown.

ALEXANDER.

1st, Alvah E. Otis, Rochester.

MILDING.

1st, C. F. Davis, Centre Barnstead.

FALL JENNETTING.

1st, James W. Foss, Rochester.

GRAPES.

General exhibit. — 1st, George Simons, Weare; 2d, D. G. Roberts, Goffstown.

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CONCORD.

1st, D. G. Roberts, Goffstown; 2d, George Simons, Weare.

DELAWARE.

1st, D. G. Roberts, Goffstown; 2d, George Simons, Weare.

HARTFORD PROLIFIC.

1st, Mrs. Emma Merrill, Goffstown.

MOORE'S EARLY.

1st, J. W. Folsom, Salisbury; 2d, W. E. Gay, Hillsborough.

SALEM.

2d, George Simons, Weare.

WORDEN.

1st, George Simons, Weare.

BRIGHTON.

1st, W. F. Gay, Hillsborough.

LADY EMPIRE STATE.

2d, W. E. Gay, Hillsborough.

DAME'S AMBER.

1st, C. W. Dame, Rochester.

PEACHES.

Four varieties. — 2d, T. C. Sweatt, Webster.

CRAWFORD'S EARLY.

1st, W. E. Gay, Hillsborough.

CRAWFORD'S LATE.

1st, W. E. Gay, Hillsborough; 2d, T. C. Sweatt, Webster.

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FOSTER.

1st, W. E. Gay, Hillsborough; 2d, James W. Foss, Rochester.

SEEDLING.

1st, W. E. Gay, Hillsborough; 2d, John M. Colby, Hooksett.

RED RARERIPE.

1st, T. C. Sweatt, Webster.

SUSQUEHANNA.

1st, W. E. Gay, Hillsborough.

PLUMS.

Four varieties. — 1st, G. E. Smith, Meredith; 2d, F. G. Hersey, East Andover.

LOMBARD.

1st, R. N. S. Batchelder, Northfield; 2d, John B. Yeaton, Northfield.

JEFFERSON.

1st, F. G. Hersey, East Andover; 2d, G. F. Smith, Meredith.

BRADSHAW.

1st, W. E. Gay, Hillsborough.

NIAGARA.

1st, R. N. S. Batchelder, Northfield.

GREEN GAGE.

1st, G. F. Smith, Meredith.

DUANE'S PURPLE.

1st, T. S. Pulsifer, Plymouth.

GERMAN PRINCE.

1st, W. E. Gay, Hillsborough.

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WASHINGTON.

1st, W. E. Gay, Hillsborough.

MOORE'S ARCTIC.

1st, George Simons, Weare.

QUINCES.

YELLOW.

1st, W. F. Wadleigh, Webster; 2d, T. C. Sweatt, Webster.

PEARS.

Eight varieties. — 1st, Albert A. Bertwell, Ossipee; 2d, C. C. Shaw, Milford.

BARTLETT.

1st, G. F. Smith, Meredith; 2d, F. P. Wentworth, Rochester.

BELLE LUCRATIVE.

1st, George Simons, Weare; 2d, C. C. Shaw, Milford.

DIX.

2d, C. C. Shaw, Milford.

DOYENNE BOUSSOCK.

1st, C. W. Dame, Rochester.

BEURRE D'ANJOU.

1st, C. W. Dame, Rochester; 2d, C. C. Shaw, Milford.

WADLEIGH.

2d, A. H. Colby, Tilton.

GOODALE.

1st, C. W. Dame, Rochester.

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LOUISE BONNE DE JERSEY.

1st, F. P. Wentworth, Rochester; 2d, C. C. Shaw, Milford.

MOUNT VERNON.

1st, F. P. Wentworth, Rochester; 2d, C. C. Shaw, Milford.

ONONDAGA.

1st, C. C. Shaw, Milford; 2d, F. P. Wentworth, Rochester.

SECKEL.

1st, Mrs. John H. Kenison, Tilton; 2d, C. C. Shaw, Milford.

SHELDON.

1st, H. B. Sanborn, Webster; 2d, George Simons, Weare,

DANA'S HOVEY.

1st, F. P. Wentworth, Rochester.

URBANISTE.

2d, C. C. Shaw, Milford.

LAWRENCE.

1st, Albert A. Bertwell, Ossipee; 2d, F. P. Wentworth, Rochester.

CLAPP'S FAVORITE.

1st, George Simons, Weare; 2d, George W. Dearborn, Hill.

FLEMISH BEAUTY.

1st, Albert A. Bertwell, Ossipee.

ASSORTED PEARS.

1st, Albert A. Bertwell, Ossipee; 2d, Frank P. Wentworth, Rochester.

Judge. — O. B. Hadwen.

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GRAIN AND SEEDS.

CORN, TWELVE-ROWED.

1st, John M. Colby, Hooksett; 2d, Byron Shaw, Franklin Falls; 3d, Myron C. Foster, Canterbury.

CORN, EIGHT-ROWED.

1st, Henry C. Smith, Plymouth; 2d, D. G. Roberts, Goffstown Centre; 3d, Eben B. Calef, Tilton.

POP-CORN.

1st, Byron Shaw, Franklin Falls.

SPRING WHEAT.

1st, J. Y. Jewett, Lake Village; 2d, G. W. Patterson, East Tilton.

OATS.

1st, George L. Capron, Marlborough; 2d, J. W. Folsom, Salisbury.

BARLEY.

1st, J. M. Taylor, Sanbornton; 2d, John B. Wadleigh, Gaza.

BUCKWHEAT.

1st, G. M. C. Sanborn, Penacook; 2d, G. W. Elkins, East Tilton.

INDIA WHEAT.

1st, C. W. Bedell, Littleton; 2d, R. N. S. Batchelder, Northfield.

SPRING RYE.

1st, Willie M. Batchelder, Northfield.

WINTER RYE.

1st, Morrill Moore, Tilton; 2d, John L. Kelley, Franklin Falls.

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TIMOTHY SEED.

1st, R. N. S. Batchelder, Northfield; 2d, Ward Parker & Son.

LARGE FIELD BEANS.

1st, C. W. Bedell, Littleton; 2d, G. W. Elkins, East Tilton.

SMALL FIELD BEANS.

1st, Mrs. Olive J. Kelley, Franklin Falls; 2d, Morrill Moore, Tilton.

FIELD PEAS.

1st, C. W. Bedell, Littleton.

MILLET.

1st, D. G. Roberts, Goffstown.

Judges. — George R. Drake, David E. Burbank.

VEGETABLES.

BEANS, FOUR NAMED VARIETIES.

1st, Ellen S. Shaw, Franklin Falls; 2d, J. G. Clark, Franklin.

BEETS, BLOOD TURNIP.

1st, Myron C. Foster, Canterbury; 2d, Reed P. Silver, Manchester.

CABBAGE.

Winningstadt. — 1st, Luther E. Page, Gilmanton Iron works; 2d, Frank P. Stevens, Goffstown.

Flat Dutch. — 1st, Morrill Moore, Tilton.

Red. — 1st, S. B. Gilchrist, Goffstown.

Savoy. — 1st, J. F. Leighton, Franklin Falls; 2d, Morrill Moore, Tilton.

All Seasons. — 1st, S. B. Gilchrist, Goffstown; 2d, William Neal, Meredith.

Henderson's. — 1st, Charles H. Foss, Tilton; 2d, S. B. Gilchrist, Goffstown.

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CARROTS.

Long Orange. — 1st, Clyde A. Gile, Tilton; 2d, Morrill Moore, Tilton.

Danvers. — 1st, L. M. French, Tilton; 2d, H. B. Holman, East Tilton.

Cheteney. — 1st, D. G. Roberts, Goffstown.

Ox Heart. — 2d, Frank P. Stevens, Goffstown.

CAULIFLOWER.

Snowball. — 1st, Morrill Moore, Tilton.

Perfection. — 1st, S. B. Gilchrist, Goffstown.

CELERY.

Boston Market. — 1st, G. F. Smith, Meredith; 2d, Jason Foss, Tilton.

White Plume. — 1st, John L. Kelley, Franklin.

Giant Paschal. — 1st, G. F. Smith, Meredith.

SWEET CORN.

Stowel's Evergreen. — 1st, T. C. Sweatt, Webster.

Early. — 1st, Morrill Moore, Tilton.

CRANBERRIES.

1st, George W. Dearborn, Hill; 2d, Mrs. F. C. Robertson, Tilton.

CUCUMBERS.

1st, Mrs. L. A. Moore, Tilton; 2d, G. F. Smith, Meredith.

Kohl Rabi. — 1st, S. B. Gilchrist, Goffstown.

MELONS.

Watermelon. — 1st, S. B. Gilchrist, Goffstown.

Green Fleshed Musk. — 1st, S. B. Gilchrist, Goffstown.

Yellow Fleshed Musk. — 1st, S. B. Gilchrist, Goffstown.

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ONIONS.

Red. — 1st, H. H. Cross, East Andover; 2d, J. F. Leighton, Franklin Falls.

Yellow Danvers. — 1st, H. E. Batchelder, Loudon; 2d, W. C. Wells, Belmont.

Top. — 1st, J. F. Bailey, Sanbornton.

PARSNIPS.

Long White. — 1st, L. M. French, Tilton; 2d, Daniel S. Clay, Tilton.

POTATOES.

Early Rose. — 1st, L. M. French, Tilton; 2d, J. F. Bailey, Sanbornton.

Early Queen. — 1st, J. B. Calef, Sanbornton; 2d, John L. Kelley, Franklin Falls.

Beauty of Hebron. — 1st, G. W. Elkins, East Tilton; 2d, Otis S. Sanborn, Sanbornton.

Snowflake. — 1st, Abbie G. Durgin, Tilton; 2d, Charles H. Foss, Tilton.

Early Vermont. — 1st, Charles H. Foss, Tilton; 2d, Myron C. Foster, Canterbury.

Clark's No. 1. — 2d, Morrill Moore, Tilton.

Burpee's Early. — 1st, Myron C. Foster, Canterbury.

Burbank Seedlings. — 1st, Luther E. Page, Gilmanton Iron Works.

Early Maine. — 1st, A. H. Colby, Tilton; 2d, Byron Shaw, Franklin Falls.

Polaris. — 1st, J. M. Taylor, Sanbornton; 2d, G. W. Elkins, East Tilton.

Bliss Triumph. — 1st, Luther E. Page, Gilmanton Iron Works; 2d, G. W. Elkins, East Tilton.

Belle of Brunswick. — 2d, H. B. Holman, East Tilton.

White Star. — 1st, Luther E. Page, Gilmanton Iron Works; 2d, Morrill Moore, Tilton.

Clough's Seedlings. — 1st, P. C. Clough, Canterbury.

Charles Downing. — 1st, Charles W. Emery, Canterbury; 2d, Daniel S. Clay, Tilton.

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Dakota Red. — 1st, J. F. Leighton, Franklin Falls; 2d, Morrill Moore, Tilton.

Black German. — 1st, A. R. Ayers, North Boscawen.

Stray Beauty. — 1st, P. C. Clough, Canterbury; 2d, Wm. Neal, Meredith.

Bonne. — 2d, G. E. Fellows, Salisbury.

Magnum Bonum. — 2d, William Neal, Meredith.

White Elephant. — 2d, E. B. Merrill, East Andover.

Sunlit. — 2d, J. Y. Jewett, Lake Village.

Queen of the Roses. — 1st, J. Y. Jewett, Lake Village.

Strawberry. — 2d, Charles H. Foss, Tilton.

Campbell. — 2d, Luther E. Page, Gilmanton Iron Works.

Lady's Fingers. — 1st, Abbie G. Durgin, Tilton.

Queen of the Valley. — 2d, Luther E. Page, Gilmanton Iron Works.

Early Sunrise. — 1st, Luther E. Page, Gilmanton Iron Works.

Rural Blush. — 1st, Luther E. Page, Gilmanton Iron Works.

Belle. — 1st, George E. Fellows, Salisbury.

PUMPKINS.

Field. — 1st, Clyde A. Gile, Tilton; 2d, Morrill Moore, Tilton.

Sweet. — D. G. Roberts, Goffstown; 2d, Byron Shaw, Franklin Falls.

Negro. — 1st, D. G. Roberts, Goffstown.

PEPPERS.

1st, Morrill Moore, Tilton; 2d, J. F. Bailey, Sanbornton.

SQUASHES.

Hubbard. — 1st, S. B. Gilchrist, Goffstown; 2d, John L. Kelley, Franklin Falls.

Turban. — 1st, S. D. Weeks, Hill; 2d, S. W. Elkins, East Tilton.

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Bay State. — 1st, S. B. Gilchrist, Goffstown.

Summer. — 1st, Reed P. Silver, Manchester.

Putman. — 1st, S. B. Gilchrist, Goffstown; 2d, D. G. Roberts, Goffstown.

Marrow. — 1st, John L. Kelley, Franklin Falls; 2d, W. C. Wells, Belmont.

Marblehead. — 2d, S. B. Gilchrist, Goffstown.

Dewing. — 1st, Frank P. Stevens, Goffstown.

TOMATOES.

Beauty. — 1st, Reed P. Silver, Manchester.

Liveington's Perfection. — 1st, F. P. Grant, Laconia.

Plum. — 1st, John L. Kelley, Franklin.

TURNIPS.

Yellow. — 2d, Luther E. Page, Gilmanton.

White. — 2d, Luther E. Page, Gilmanton.

Rutabaga. — 1st, H. H. Cross, East Andover.

BEETS.

Mangel Wurtzel. — 1st, Charles W. Emery, Canterbury; 2d, William Neal, Meredith.

Judges. — G. W. Stevens, F. H. Flanders, G. H. Haley.

DAIRY.

BUTTER.

Dairy prints. — 1st, F. H. Robinson, North Sanbornton; 2d, Charles W. Emery, Canterbury; 3d, D. G. Roberts, Goffstown; 4th, Mrs. George B. Lane, Sanbornton.

Dairy tub. — 1st, E. C. Goodell, North Sanbornton; 2d, Charles W. Emery, Canterbury; 3d, Mrs. F. H. Robinson, Sanbornton; 4th, A. H. Colby, Tilton.

Creamery prints. — 1st, Lebanon Creamery, Lebanon; 2d, Cold Brook Creamery, Franklin Falls.

Creamery tubs. — 1st, John B. Wadleigh, Gaza.

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CHEESE.

1st, T. S. Pulsifer, Plymouth; 2d, P. C. Clough, Canterbury; 3d, Henry C. Smith, Plymouth; 4th, Mrs. G. H. Healey, East Andover.

Judge. — H. K. Slayton.

BREAD (HOME MADE).

White. — 1st, Fannie Whicher, Northfield; 2d, Lucretia A. Sanborn, Franklin Falls; 3d, Kate F. Hill, Northfield.

Brown. — 1st, Martha A. Foss, Tilton; 2d, Mrs. S. D. Weeks, Sanbornton; 3d, Mrs. George B. Lane, Sanbornton.

Graham. — 1st, Mrs. F. E. Frost, Webster; 2d, Mrs. S. D. Weeks, Hill; 2d, Mrs. Olive J. Kelley, Franklin Falls.

CAKE.

1st, Miss Annie Benton, Hanover.

Judges. — Mrs. C. W. Bedell, Mrs. C. K. Sanborn, Mrs. T. J. Courser.

CANNED FRUIT AND PRESERVES.

CANNED FRUIT.

General exhibit. — Mrs. T. C. Sweatt, Webster.
Peaches. — 1st, Mrs. S. D. Weeks, Hill.
Plums. — 1st, Mrs. F. J. Thomas, North Sanbornton.
Strawberries. — 1st, Mrs. T. C. Sweatt, Webster.
Raspberries. — 1st, Mrs. John H. Kenison, Tilton.
Quinces. — 1st, Mrs. T. C. Sweatt, Webster.
Cherries. — 1st, Mrs. S. D. Weeks, Hill.
Tomatoes. — 1st, Mrs. D. G. Roberts, Goffstown.
Blackberries. — 1st, Clara B. Gove, Gilford.
Citron. — 1st, Mrs. F. J. Thomas, Sanbornton.

PRESERVES.

Quinces. — 1st, Mrs. T. C. Sweatt, Webster.
Apples. — 1st, Mrs. T. C. Sweatt, Webster.
Plums. — 1st, Mrs. T. C. Sweatt, Webster.

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Pears. — 1st, Mrs. F. J. Thomas, North Sanbornton.
Strawberries. — 1st, Mrs. T. C. Sweatt, Webster.
Raspberries. — 1st, Mrs. T. C. Sweatt, Webster.
Currants. — 1st, Mrs. S. D. Weeks, Hill.
Cherries. — 1st, Mrs. T. C. Sweatt, Webster.
Blackberries. — 1st, Mrs. T. C. Sweatt, Webster.
Assorted Pickles. — 1st, P. C. Clough, Canterbury.
Tomato Catsup. — 1st, Mrs. Olive J. Kelley, Franklin Falls.

JELLY.

Apple. — 1st, P. C. Clough, Canterbury.
Raspberry. — 1st, Mrs. C. R. Allen, Littleton.
Grape. — 1st, Mrs. George B. Lane, Sanbornton.
Currant. — 1st, Mrs. Olive J. Kelley, Franklin.
Blackberry. — 1st, Mrs. C. R. Allen, Littleton.

Judges. — Mrs. C. W. Bedell, Mrs. C. K. Sanborn, Mrs. T. J. Courser.

BEES, HONEY, AND SUGAR.

BEES AT WORK.

1st, Charles H. Foss, Tilton.

HONEY IN COMB.

1st, Charles H. Foss, Tilton; 2d, C. W. Bedell, Littleton.

MAPLE SUGAR.

1st, Mrs. G. W. Sanborn, Gilford; 2d, Mrs. D. S. Clay, Tilton.

MAPLE SYRUP.

1st, Fannie Whicher, Tilton; 2d, V. M. Sanborn, Franklin Falls.

Judges. — Mrs. C. W. Bedell, Mrs. C. K. Sanborn, Mrs. T. J. Courser.

PAINTINGS.

Oil, general exhibit. — 1st, Mrs. J. W. Cogswell, Gilmanton; 2d, M. Eva Dearborn, Tilton.

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On china. — 1st, Mabel Blanchard, Lake Village; 2d, Mrs. Ada Stevens, Goffstown.

Flowers in oil. — 1st, Mary Burleigh, Tilton; 2d, Mrs. John C. Ela, Warren.

On silk. — 1st, Mrs. Frank Hill, Tilton; 2d, Mrs. J. W. Cogswell, Gilmanton.

On plush. — 1st, Mrs. Ada Stevens, Goffstown; 2d, Mrs. B. B. Davinson, Sanbornton.

On felt. — 1st, Mrs. D. B. Sanborn, Sanbornton; 2d, Miss Martha Stevens, Goffstown.

Crayon portrait. — 1st, Albert Saltmarsh, Concord; 2d, Lena M. Flanders, Lake Village.

Landscape from nature. — 1st, Mary Burleigh, Tilton; 2d, Mrs. J. C. Morrison, Boscawen.

Pastel. — 1st, Mrs. Ada Stevens, Goffstown; 2d, Mrs. George B. Stevens, Goffstown.

Charcoal sketch. — 1st, Mary A. Rowell, Franklin.

Crayon pictures. — 1st, Elmore C. Weeks, Hill.

Water colors. — 1st, Mrs. J. W. Cogswell, Gilmanton.

Worsted picture. — 1st, Mrs. Daniel Wyman, Concord.

Judges. — C. H. Pettee, Mrs. Charles McDaniel, Miss Alice Darling.

NATURAL HISTORY.

Living birds. — 1st, Hattie A. Yeaton, Northfield.

Stuffed birds. — 1st, Ned Dearborn, Tilton; 2d, Mrs. Lucy Holt, Goffstown.

Stuffed animals. — 1st, Ned Dearborn, Tilton; 2d, Mrs. Lucy Holt, Goffstown.

Native woods. — 1st, Ned Dearborn.

Herbarium. — 1st, Fred Fuller, Hanover; 2d, Bertha M. Sanborn, Franklin Falls.

Judges. — Lizzie F. Hill, Mrs. F. H. Flanders.

NEEDLEWORK AND EMBROIDERY.

General exhibit. — 1st, Mrs. Frank Hill, Tilton; 2d, Mrs. George M. C. Sanborn, Penacook.

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Cotton embroidery. — 1st, L. A. Dyer, New Hampton; 2d, Mrs. L. E. Page, Gilmanton Iron Works.

Silk embroidery. — 1st, Mrs. Lizzie F. Hill, Derry; 2d, Josie Cook, Gilmanton.

Crochet work. — 1st, Mrs. Dr. Cooledge, Warner; 2d, Mrs. W. A. Batchelder, East Andover.

Hand-knit work. — 1st, Sarah L. Davis, Centre Barnstead; 2d, Mrs. Fred Philbrick, Meredith.

Crazy quilt, silk. — 1st, Mrs. A. Huntoon, Wing Road; 2d, Lizzie A. Brockway, Franklin Falls.

Log cabin quilt. — 1st, Nellie Lakeman, Concord; 2d, Mrs. Hattie Hutchinson, Chichester Centre.

Crocheted quilt. — 1st, Mrs. F. E. Frost, Webster.

Knotted work quilt. — 1st, Mrs. E. F. Nelson, Gilmanton.

Outline quilt. — 1st, Abbie Williams, Whitefield; 2d, Mrs. W. A. Batchelder, East Andover.

Knit quilt. — 1st, Mrs. A. W. Miner, Whitefield; 2d, Mrs. W. A. Batchelder, East Andover.

Worsted quilt. — 1st, Sarah B. Keay, Sanbornton; 2d, Mrs. S. A. Howard, New Hampton.

Calico patchwork quilt. — 1st, Mrs. M. B. Gilman, Sanbornton; 2d, Mrs. D. Coffin, Gilmanton.

Rag carpet. — 1st, Abbie Williams, Whitefield; 2d, Mrs. O. H. Glines, Whitefield.

Drawn rug. — 1st, Annie E. Ayers, North Boscawen; 2d, Mrs. Celia Hurlburt, Hanover.

Braided rug. — 1st, Mrs. O. H. Glines, Whitefield; 2d, Mrs. A. Huntoon, Wing Road.

Crocheted rug. — 1st, Dudley Leavitt, Meredith; 2d, Mrs. O. T. Clough, Goffstown.

Ravelled rug. — 1st, Mrs. S. W. Sanford, Gilford; 2d, Ellen M. Corliss, Lake Village.

Table cover. — 1st, Mrs. D. Coffin, Gilmanton; 2d, Mrs. Charles Mason, Etna.

Table scarf. — 1st, Mrs. E. C. Hutchinson, Milford; 2d, Mrs. James Cogswell, Gilmanton.

Bureau scarf. — 1st, Mrs. O. M. Carr, Meredith; 2d, Mrs. Lilla Tirrell, Goffstown.

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Worsted lambrequin. — 1st, Sarah L. Davis, Centre Barnstead; 2d, Mrs. L. M. Jones, Merrimac.

Picture drapery. — 1st, Stella Paige, Belmont.

Toilet cushion. — 1st, Mrs. Orville Smith, Meredith; 2d, Mrs. Georgia Colby, Concord.

Pillow shams. — 1st, Jennie M. Huse, Centre Barnstead; 2d, Mrs. W. C. Noyes, Bethlehem.

Knit lace. — 1st, Annie E. Ayers, North Boscawen; 2d, Abbie Cotton, Milford.

Crocheted lace. — 1st, Millie F. Weeks, Gilford; 2d, Mrs. Cora Drake, New Hampton.

Darned lace. — 1st, Mrs. Sarah B. Keay, Sanbornton; 2d, Mrs. W. C. Noyes, Bethlehem.

Hand bag. — 1st, Mrs. Addie Flanders, New Hampton; 2d, Mrs. A. W. Miner, Whitefield.

Infant's basket. — 1st, Mrs. Frank Hill, Tilton; 2d, Mrs. N. J. Bachelder, East Andover.

Hand-knit hose. — 1st, Mrs. E. E. Parker, Reed's Ferry; 2d, Mary W. Gile, Tilton.

Hand-knit mittens. — 1st, Lucinda I. Colbath, Centre Barnstead; 2d, G. W. Springfield, Rochester.

Darned hose. — 1st, Mary W. Gile, Tilton; 2d, Mrs. A. Huntoon, Wing Road.

Specimen of patching. — 1st, Mrs. G. W. Moulton, Thornton's Ferry; 2d, Mrs. Isaiah Piper, Belmont.

Outline work. — 1st, Stella H. Paige, Belmont; 2d, Alice E. Moore, Goffstown.

Cotton tidy. — 1st, J. E. Smith, Tilton; 2d, Miss Abbie Cotton, Milford.

Linen tidy. — 1st, Mrs. M. A. Otis, Rochester; 2d, Mrs. C. R. Allen, Littleton.

Silk tidy. — 1st, Mrs. E. L. Clifford, Hanover; 2d, Mrs. G. W. Morrill, Gilford.

Felt tidy. — 1st, Mrs. A. Huntoon, Wing Road; 2d, Mrs. H. A. Huntoon, Danbury.

Umbrella stand. — 1st, Mrs. Frank Hill, Tilton; 2d, Mary A. Rowell, Franklin.

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Sofa pillow. — 1st, Mrs. C. W. Bedell, Littleton; 2d, Mrs. Perley Kidder, Milford.

Mexican work. — 1st, Mrs. C. R. Allen, Littleton; 2d, Mrs. George M. C. Sanborn, Penacook.

Afghan. — 1st, Miss Alvena Swett, Hanover; 2d, Mellie F. Eastman, East Andover.

Best exhibit by a patron under 17 years. — 1st, Ella F. Drake, New Hampton.

Photograph case. — 1st, Mrs. J. W. English, Littleton; 2d, M. Eva Dearborn, Tilton.

Head rests. — 1st, Mrs. C. L. Pearsons, Hanover; 2d, Mrs. G. W. Sanborn, Penacook.

Handkerchief case. — 1st, Annie E. Hadley, Lake Village; 2d, Miss Mabel Glines, Northfield.

Aprons. — 1st, Miss Carrie Woodman, Tilton; 2d, Lillian Rose, Concord.

Judges. — Mrs. Lizzie F. Hill, Mrs. F. H. Flanders, Mrs. J. E. Shepard.

PLANTS AND FLOWERS.

Potted plants. — 1st, Cyrus P. Dow, Laconia; 2d, F. P. Grant, Laconia; 3d, Martha A. Foss, Tilton.

Cut flowers. — 1st, Mrs. G. E. Fellows, Salisbury; 2d, Ellen S. Shaw, Franklin Falls.

Dahlias. — 1st, E. N. Vickery, Meredith; 2d, Mrs. O. C. Wyatt, Northfield.

Verbenas. — 1st, Mrs. Carrie B. Little, Salisbury; 2d, Mrs. Olive J. Kelley, Franklin Falls.

Asters. — 1st, Mrs. M. P. Bailey, Claremont; 2d, F. O. Melvin, Bradford.

Geraniums. — 1st, Cyrus P. Dow, Laconia; 2d, Ellen S. Shaw, Franklin Falls.

Sweet peas. — 1st, Mrs. W. A. Batchelder, East Andover; 2d, Mrs. George E. Fellows, Salisbury.

Pansies. — 1st, Mrs. F. C. Robertson, Tilton; 2d, L. F. Batchelder, Tilton.

Judges. — Mrs. D. W. Rugg, Mrs. L. A. Dyer, Mrs. H. W. Nimms.

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BABIES.

Handsomest baby. — 1st, Mrs. C. L. Parsons, Hanover, for Annie Guerard Parsons; 2d, Mrs. A. H. Colby, Tilton, for Ethel Mildred Colby; 3d, Mrs. Fred S. Kilburn, Belmont, for Charlie Kilburn.

Tastily dressed baby. — 1st, Mrs. Mabel R. Bailey, Nashua, for Gladys Viola Bailey; 2d, Mrs. H. B. Holman, East Tilton, for Sidney Plumer Holman.

Best behaved baby. — 1st, Mrs. S. F. Burbank, Suncook, for Priscilla Ann Burbank; 2d, Mrs. Fred Huntoon, Danbury, for Mary Estelle Huntoon.

Heaviest over six months. — 1st, Mrs. Warren Hall, Pembroke, for Harry Amsden Hall; 2d, Mrs. E. C. Cole, Warner, for Edward Everett Cole.

Heaviest under six months. — 1st, Mrs. F. H. Robinson, Sanbornton, for Gary Frank Robinson; 2d, Mrs. Fred Dodge, Lancaster, for Clarence Fred Dodge.

Gladys Viola Bailey, Nashua	Medal.
Sidney Plumer Holman, East Tilton	"
Bernice Eloise Perkins, Danbury	"
Rebecca Dorothy Collins, Gilmanton	"
Mary Estelle Huntoon, Danbury	"
Maurice Edwin Downs, West Andover	"
Mildred Alma White, Danbury	"
Blanche Evelyn Thompson, Laconia	"
Mabel Elizabeth Beatty, Hartford, Conn.	"
Estelle Frances Emerson, Etna	"
Annie Guerard Parsons, Hanover	"
Clarence Fred Dodge, Lancaster	"
Priscilla Ann Burbank, Suncook	"
Marion Hazel Goodhue, Boscawen	"
Charlie Kilburn, Belmont	"
Harry Amsden Hall, Pembroke	"
Ethel Mildred Colby, Tilton	"
Gary Frank Robinson, Sanbornton	"
John Samuel Heath, Tilton	"

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Earle Everett Danforth, Warner . . . . Medal.
Edward Everett Cole, Warner . . . . "

SPEED DEPARTMENT.

HORSES AND COLTS.

Foals of 1890. — One half mile, 2 in 3. — 1st, C. W. Davis, Dover, Beauvoir; 2d, W. F. Daniell, Franklin Falls, X. L. Time — 1.43, 1.41, 1.43.

Foals of 1889. — One half mile, 2 in 3. — 1st, W. F. Daniell, Franklin Falls, Much Ado; 2d, G. W. Silver, Penacook, New Flower; 3d, Levi Clarke, Pittsfield, Allen Boy; 4th, George R. Nichols, Barnstead, Sailing Glencoe. Time — 1.29, 1.30.

Foals of 1888. — One half mile, 3 in 5. — 1st, W. F. Daniell, Franklin Falls, Edith H; 2d, George F. Kelley, Gilmanton, Whirlwind; 3d, C. J. Chamberlain, Northfield, Sly Ben; 4th, George P. Titcomb, Salisbury, Ned Wilkes. Time — 2.52, 2.53, 2.52.

Foals of 1887. — One mile, 3 in 5. — 1st, J. E. Kent, Newmarket, Cromwood; 2d, George F. Kelley, Gilmanton, Alcoe; 3d, J. D. Cruikshank, Laconia, Joan of Arc; 4th, Sam Hodson, Meredith, Goldmont. Time — 2.43, 2.37, 2.35.

Special class. — One mile, 3 in 5. — 1st, W. F. Daniell, Franklin Falls, Lady Lewis; 2d, C. C. Kenrick, Franklin Falls, Mayflower; 3d, E. F. Hall, Gilmanton, Lynn. Time — 2.46, 2.45, 2.43, 2.46.

Three minute. — One mile, 3 in 5. — 1st, C. G. Blanchard, Concord, Ethel Lambert; 2d, C. W. Davis, Dover, Woodburn Wilkes; 3d, C. C. Kenrick, Franklin Falls, Fleetwood. Time — 2.41, 2.40, 2.41.

Stallions. — One mile, 3 in 5. — 1st, F. L. Gerald, Laconia, Glencoe Wilkes; 2d, Martin Woodman, Meredith, Falcon Boy; 3d, C. G. Blanchard, Concord, Harry Lambert; 4th, Geo. A. Brown, Contoocook, John B. Clarke. Time — 2.46, 2.47, 2.41, 2.43.

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Free for all. — One mile, 3 in 5. — 1st, J. W. Wilson, Lowell, Mass., Arthur Wilkes; 2d, J. H. Taylor, Penacook, Home Rule. Time — 2.27, 2.27, 2.30.

Judges. — T. O. King, C. H. Bowles, Alonzo Towle.

F. P. JOHNSON, *Clerk*.

N. J. BACHELDER,
Secretary.

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NEW HAMPSHIRE

TROTTING-HORSE BREEDERS' ASSOCIATION.

OFFICERS FOR 1891.

Hon. WARREN F. DANIELL, *President*		Franklin.
Hon. PERSON C. CHENEY,	*Vice-Presidents*	Manchester.
Hon. CHESTER PIKE,		Cornish.
JOHN S. BLANCHARD, *Treasurer*		Concord.
W. C. CLARKE, *Secretary*		Manchester.
GEORGE M. STEVENS, *General Superintendent*		Lancaster.
C. C. KENRICK, *Assistant Superintendent*		Franklin.

EXECUTIVE COMMITTEE.

George M. Stevens, Lancaster.
Warren F. Daniell, Franklin.
John S. Blanchard, Concord.
Person C. Cheney, Manchester.
Chester Pike, Cornish.
W. C. Clarke, Manchester.
George Van Dyke, Lancaster.
F. L. Gerald, Laconia.
W. H. H. Moody, Claremont.
Sam Hodson, Meredith.
C. C. Kenrick, Franklin.
C. W. Davis, Dover.
B. D. Whitcomb, Newmarket.
A. T. Batchelder, Keene.
F. H. Foster, Tilton.
W. M. Leet, Claremont.
C. J. Chamberlain, Northfield.
L. D. Marston, Pittsfield.
J. L. Loverin, Tilton.
F. B. Bartlett, Milford.
L. T. Hazen, Hazen's Mills.
H. W. Keyes, North Haverhill.
Wm. K. Wallace, Woodsville.
Seth M. Richards, Newport.
I. W. Springfield, Rochester.
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SECRETARY'S REPORT.

First meeting held at Tilton and Franklin Driving Park, Tilton, N. H., October 6, 7, and 8, 1891.

First Day.

The blasts of winter blew across Tilton park when its gates were opened to usher in the first day of the initial trotting meeting of the New Hampshire Trotting Horse Breeders' Association, yet there was a good attendance of people when the races were called this afternoon. The wintry air and blustering northwest wind were most unfavorable for trotting, yet in the face of such conditions three of the most interesting races of their kind contested in New Hampshire this season were witnessed.

The work of stock judging began shortly after 10 A. M. Mr. Harry R. Lawrence, of Brattleborough, Vt., and Mr. C. H. Bowles, of Plymouth, had this difficult duty in hand, and they entered upon their work fearlessly. The first class called was the gelding class. This was the only class connected with the meeting that had a light entry, and the judges had little difficulty in reaching a decision. They awarded first premium in the yearling class to Bert C, by Ivy Wilkes, dam by Col. Cross. This colt was bred and entered by H. N. Clay, of Laconia. The only other animal exhibited was Dandy, by George N. Wilkes. He was awarded second premium as a two-year-old.

The roadster stallion class brought out four animals, and the judges found a harder task before them. George N. Wilkes and John B. Wilkes, both sons of Mambrino Wilkes, and owned by S. K. Boyce, of Canterbury, the only ones of the number who were shown with four or more of their get, and first and second premiums respectively were awarded them. The judges awarded the blue ribbon in the same class where animals were shown without four of their get, to Beechwood by Wedgewood, dam by Shakespeare (Lily's) entered by Edgar Merrill, of Plymouth; second premium to

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Ned Wilkes by Mambrino Wilkes, dam by Flying Rocket, owned by C. W. Cummings, of Warren.

The standard stallion class was called, but the judges did not have time to complete their work. Viking and Stornaway were the only horses shown. Beauvoir and possibly Glencoe Wilkes will be examined to-morrow. Viking had a family exhibit that has rarely been equalled in the North, and one that fairly captured the horsemen present.

In accordance with public announcement, the races were called sharply at 1.30 P. M. George M. Stevens, of Lancaster; H. R. Lawrence, of Brattleborough, Vt.; and C. H. Bowles, of Plymouth, were in the stand as judges. The first race called was the yearling stake. This had five starters, and a good deal of trouble was experienced in getting the youngsters off. When the word did come Bellvoir took the lead and opened up what looked like a winning lead. X. L. was in second place and drumming along right merrily. The rest were scattered along behind, several lengths apart. The Davis filly held her commanding lead past the three-quarter pole. At the upper turn she went into the air and lost several lengths. X. L., meantime, had been gaining ground and was right there ready to take advantage of any mishaps. Bellvoir entered the home stretch with a winning lead and held it to the distance post, when she broke again and did not recover until X. L. had overtaken and passed her. The Daniell colt finished strong and went under the wire a winner of the heat by an open length in 3.16½. It was a termination that was quite unexpected, yet it only furnished another example of the uncertainty of colt trotting. Irving Russell was a good third, and the others way back. X. L. was warmly applauded for his game finish. The summary:

Yearling race. Stake value, $110. Mile dash.

X. L., b. c., by Emperor Wilkes; dam by Gov. Sprague, W. F. Daniell, Franklin 1

Bellvoir, b. f., by Beauvoir; dam s. t. b. by Columbus Horse, C. W. Davis, Dover 2

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Irving Russell, b. c., by Beauvoir; dam by King Patchen, I. W. Springfield, South Wolfeborough . . . 3
Butterfield's Almont, br. c., by Kentucky Almont; dam by Lang Horse, W. L. Butterfield, Great Falls . . 4
Ray Wilkes, b. f., by Mambrino Wilkes; dam by Taggart's Abdallah, H. P. Ray, Manchester . . . 5
Time — 3.16½.

Several of the colts were handicapped in a contest of mile heats, not having been fitted for such a distance.

The second race called was the Foster stakes for four-year-olds. This stake was made especially attractive by reason of the generous donation of $100 added money, made by Mr. F. H. Foster, of Tilton, owner of Viking 2.19¼. There were four starters and the Woodbrino colt, Cromwood, who won the four-year-old race at the Grange Fair, trotting in 2.35¾, and who got a mark at Mystic last week of 2.32, was picked for a sure winner. Here again the straight tips got another upsetting. Cromwood won the first heat in 2.39, and in the second went dead lame behind, and would have been distanced twice over if distance had not been waived by mutual consent. He went lame in his off hind leg, which has been weak since he was a two-year-old, and was wisely laid up. With Cromwood out, the race lost its chief interest, for Johnny Taylor's Viking, Jr., was hot stuff, and was right on the heels of the Kent colt when he won the first heat. Had Cromwood continued all right he would have been forced to trot a merry race to beat the Taylor four-year-old, who is a sure enough trotter. Woodburn Wilkes tried to give the son of Viking a race and succeeded very well, but Taylor had links to spare whenever the son of Baron Wilkes began to threaten, and landed first money in handsome style. The victory was very popular with the crowd, besides bringing to the front another Viking colt trotter that ought to go in 2.30 this year if headed for a record. The summary tells the rest:

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Foster stakes, value $225, for foals of 1887.

Viking, Jr., b. c., by Viking, dam Molly Stark, J. H. Taylor, Penacook	2	1	1	1
Cromwood, ch. c., by Woodbrino, dam by John G. Saxe, E. Kent & Son, Newmarket	1	4	4	4
Woodburn Wilkes, b. c., by Baron Wilkes, dam by Woodburn Pilot, C. W. Davis, Dover	3	2	2	2
Joan of Arc, b. f., by Glencoe Wilkes, dam Lady Clark, J. D. Cruikshank, Laconia	4	3	3	3

Time — 2.39, 2.43, 2.42, 2.42.

The third event on the programme was the 3.00 class, and was a rattling good contest. Crete was the fastest away in the first heat, and kept a safe lead on the field until she began to come home, when Thetis came with a rush. Just before the wire was reached, Thetis broke, but she caught quickly and nosed out Crete in 2.39¼. The judges penalized Thetis and gave the heat to Crete. In the second heat Crete led to the half, where she broke and Thetis took the pole, holding it to the end and winning as she pleased. Crete finished fourth and Ethel Lambert third. The third heat was a contest between Crete and Ethel Lambert. The former finished the mile a length ahead, but was placed last for a long run under the whip, and the heat given to Ethel Lambert. Thetis was back in fourth place this time. In the next heat she and Ethel Lambert made the fight, and a pretty one it was. "Jock" Bowen was behind the Lambert mare and he made a hot bid for the heat, but Thetis beat her home in 2.38¼, the fastest mile of the day. The finish of the race was then postponed until to-morrow.

Country Boy was right up among the leaders in the heats trotted, finishing second in the third mile. Glencoe Wilkes was speedy, but unsteady. Following is the summary:

3.00 Class. Purse, $300.

Thetis, b. m., by Mambrino Wilkes, dam by Vedder's Cadmus, R. E. Foster, Webster	2	1	4	1

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Ethel Lambert, ch. m., by Harry Lambert, dam by Gen. Garibaldi, C. G. Blanchard, Concord	3	2	1	2
Crete, ch. m., by Dictator Chief, dam by Daniel Lambert	1	4	5	5
Glencoe Wilkes, b. h., by Alcantara, dam by Ericsson	5	5	3	3

Time — 2.39¼, 2.39½, 2.40, 2.38¼.

Second Day.

Rain was falling when the managers of the New Hampshire Horse Breeders' meeting awoke this morning, and hundreds of people all over the State who had planned to attend, remained at home. It was a discouraging outlook, but matters at the track progressed as smoothly as if clear skies and sunshine prevailed. The judges began their work promptly and did an enormous forenoon's work in the stock department. No such a show of colts and fillies was ever seen in New Hampshire as that brought out for their inspection. The judges were critical yet fair, and the ribbon winners had reason to feel elated at their success. It was winning in hot company. The awards resulted as follows:

STALLION COLTS.

Four years old. — 1st, Cleveland, ch. c., by Sir Walter, 2001; dam by Jubilee Lambert, 2.25. Entered by F. H. Foster, Tilton. 2d, Ivy Wilkes, b. c., by Don Wilkes, 2.24¾; dam by Mambrino Dudley, 2.19¾. Entered by H. N. Clay, Laconia.

Three years old. — 1st, Jerullo, 10662, by Thorndale Chief; dam Lady Durgin, by Walter Allen. Entered by M. A. Foster, Canterbury. 2d, Kalif, 11150, by Kaiser, 2.28½; dam by Smuggler, 2.15¼. Entered by W. T. Greene, Hopkinton.

Two years old. — 1st, Kinglet, by Viking; dam by Gen. Garibaldi. Entered by C. G. Blanchard, Concord. 2d, King Turner, by Jerome Turner, 2.15½; dam by Princeps, 536. Entered by Mt. Washington Stock Farm, Lancaster.

One year old. — 1st, X. L., by Emperor Wilkes, 2.20¾; dam

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by Gov. Sprague, 2.20¼. Entered by Warren F. Daniell, Franklin. 2d, Irving Russell, by Beauvoir, 9218; dam by King Patchen. Entered by I. W. Springfield, South Wolfeborough.

Class D, Fillies.

Four years old. — 1st, Clara K. Nelson, by Nelson, 2.10; dam Nabby Day, by son of Ballard's Cassius M. Clay, Jr. Entered by C. C. Kenrick, Franklin. 2d, Agnesia Wilkes, by Mambrino Wilkes; dam by Hodgdon's Black Hawk. Entered by Grasmere Stock Farm, Goffstown.

Three years old. — 2d, Gannett, by Mambrino Wilkes, 2.28¾; dam by General Lyon, 493. Entered by Hale P. Shaw, Canterbury. No first premium awarded.

Two years old. — 1st, Sadie Splan, by Jack Splan, 2.26¾; dam by Vermont Ranger, 7436. Entered by E. F. Pike, Franklin Falls. 2d, Millie Beauvoir, by Beauvoir; dam by Davis' Honest Allen. Entered by C. W. Davis, Dover.

One year old. — 1st, Modesty, by Viking, 2.19¼; dam by Supervisor, son of Administrator. Entered by Mt. Washington Stock Farm, Lancaster. 2d, Slick Mirror, by Electryon; dam Viking's Pride, by Viking, 2.19¼. Entered by Grasmere Stock Farm, Goffstown.

The afternoon was devoted to the races. The unfinished 3.00 class was first called, and when the horses were rung up at 1 o'clock the grand stand was fairly well filled and rows of carriages lined the track. It was a capital attendance, considering the weather. Rain held off throughout the afternoon and the entire programme of the day was carried out without postponement.

Thetis had two heats to her credit, and Ethel Lambert and Crete one each when the race was postponed Tuesday night. Thetis was the favorite. Crete was fastest away when the fifth heat was started and maintained a good lead until she entered the stretch coming home. Then Ethel Lambert closed on her and beat her to the wire, but was set back for running, and the heat awarded to Crete. The sixth heat was won easily by Crete, with Ethel Lambert second and Thetis

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third. The latter behaved rank, and was evidently not at her best. Glencoe Wilkes did not start to-day, being out of fix, and Country Boy was ruled out. The latter got fourth money, however. The summary:

3.00 Class. Purse, $300.

Crete, ch. m., C. H. Flagg, Manchester	1	4	5	5	1	1
Thetis, b. m., R. E. Foster, Webster	2	1	4	1	4	2
Ethel Lambert, ch. m., C. G. Blanchard, Concord	3	2	1	2	2	2
Country Boy, b. g., L. E. Marston, Pittsfield	4	3	2	4	3	ro
Glencoe Wilkes, b. h., F. L. Gerald, Laconia	5	5	3	3	dr.	

Time — 2.39, 2.39½, 2.40, 2.38¼, 2.38, 2.40.

The first event on the regular programme was the two-year-old colt stakes. There was a big nomination for this, but the phenomenal speed shown by Lord Brino at Mystic Park, where he made a record of 2.32¼, frightened many out, and there were but four starters. As expected, Lord Brino won the race, but not until New Flower gave him quite a scare in the first heat.

J. H. Taylor replaced G. W. Silver as a driver behind New Flower in the second heat, but the Woodbrino colt had too much speed and steadiness, and the change worked no difference in the result. Much Ado trotted even miles, and impressed everybody as being a very likely colt. The summary:

Foals of 1889. Stake value, $225.

Lord Brino, blk. c., by Woodbrino, dam by Ballard, S. F. Ham, Portsmouth	1	1
New Flower, b. c., by Nephew, 1220, dam by Electioneer, G. W. Silver, Penacook	2	2
Much Ado, b. c., by Judge Salisbury, dam by Simmons, 2.28, W. F. Daniell, Franklin	3	3
P. L. K., blk. c., by Volunteer Boy, dam by Prescott's Hambletonian, P. L. Kennedy, Franklin Falls	4	4

Time — 2.46, 2.46.

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Another phenomenon did the scare act in the three-year-old stakes. This was Queen Esther, winner of the three-year-old at the New England Breeders' meeting. She was picked for a sure winner. It turned out that she couldn't go a bit and President Daniell's great filly, Edith H., had a walk-over. Queen Esther was stiff and sore and either couldn't or wouldn't trot. The race was scarcely more than a good jog for Edith H. who can trot her miles in 2.35. The summary:

For foals of 1888. Stake value, $275.

Edith H., g. f., by Deucalion, dam by Nutbourne, W. F. Daniell, Franklin 1 1
Whirlwind, b. c., by Glencoe Wilkes, dam by Robert Allen, G. F. Kelley, Lower Gilmanton . . . 2 2
Queen Esther, b. f., by Viking, dam s. t. b. by Gideon, F. H. Foster, Tilton 3 4
Kingman, b. c., by Viking, dam by Edward Everett, L. D. Marston, Pittsfield 4 3
Time 2.49½, 2.50.

The 2.29 class wound up the programme. Falcon, Jr., won the first heat in the slow time of 2.34½, and people wondered what was in the wind. They found out when Johnny Knott captured the next three heats straight and the race without even being extended. Falcon, Jr., was plainly "off." Levi Ray drove Highland Queen a good race. The summary:

2.29 Class. Purse, $300.

Johnny Knott, b. g., by Little Moak, N. J. Stone, Manchester 2 1 1 1
Falcon, Jr., b. h., by Falcon, Sam Hodson, Meredith 1 2 2 2
Highland Queen, blk. m., by Highland Gray, Stevens & Eaton, Lancaster 3 3 3 3
Time — 2.34½, 2.29¾, 2.34¾, 2.31.

The judges of the afternoon were Dr. J. H. Riedell of Manchester, starter; H. R. Lawrence, and C. H. Bowles.

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Between the heats Stornaway trotted exhibition miles in 2.36, 2.32¾; and Montrose, owned by R. E. Foster of Webster, a mile in 2.36¼. Gregorio and stock were also shown on the track and won much admiration.

Third Day.

The third and last day of the breeders' meeting opened with a pouring rain that the weather-wise all pronounced the long delayed equinoctial storm. The clouds began to lift during the forenoon, and at noon the sun was shining brightly. The rain, however, had made its inroad on the attendance, for when the weather cleared it was too late for visitors from distant points to reach the grounds. The judges completed their work in the stock department during the forenoon. The brood mares and colts were first brought out, and their appearance in the show ring attracted great interest. It was the finest lot of mares and colts ever paraded in New Hampshire.

The awards were as follows:

Brood Mares under Eight Years Old.

1st, Clara K. Nelson, ch. f., by Nelson, 2.10; dam Nabby Day, by son of Ballard's Cassius M. Clay, Jr., 54. Entered by C. C. Kenrick, Franklin Falls. 2d, Clytie Wilkes, b. m., by Mambrino Wilkes; dam by Blaisdell Horse. Entered by J. S. Blanchard, Concord, and C. H. Fitz, Webster. 3d, Daisy Wilkes, ro. f., by Mambrino Wilkes; dam by Honest Allen, Jr. Entered by Grasmere Stock Farm, Goffstown.

Class F. Brood Mares Eight Years Old or Over.

1st, Virtu S., b. m., by Champion, son of King Patchen; dam Virgo S., by Middletown. Entered by I. W. Springfield, South Wolfeborough. 2d, Roxie J., blk. m., by Almont Eclipse; dam (the granddam of C. C. K., 2.24¼,) by Ethan, Jr., son of Honest Allen. Entered by A. R. Ayers, North Boscawen. 3d, Fairy, b. m., by Florida, 482; dam Ayer mare by Dad. Entered by Merrill Perry, Salisbury.

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Next came the standard bred foals of 1891, and this was another hot lot. Every colt had to be a registered animal and the ribbon takers had reason to feel proud. The awards:

Class G, Standard-bred Foals of 1891.

1st, Nellie, blk. f., by Mambrino Wilkes, 2.28¾; dam Kate Shaw, by Gen. Lyon, 493. Entered by Hale P. Shaw, Salisbury Centre. 2d, Lamberta Viking, ch. f., by Viking, 2.19¼; dam Daisy Lambert. Entered by J. S. Blanchard, Concord.

The last class examined were the single drivers, and as there were but two shown, little trouble was experienced in reaching a choice. The award:

Class H, Driving Horses.

1st, Highland Queen, 2.36¼, blk. m., by Highland Gray, 824; dam by Gen. Sherman, 862. Entered by Mt. Washington Stock Farm, Lancaster. No second premium awarded.

At 1 o'clock P. M., the grand parade of stock on the track, postponed from Wednesday, took place, and no such a sight was ever witnessed before in this State. Horsemen present pronounced it one of the grandest shows of blooded horses they ever saw anywhere. Not only were the animals highly bred but they were great, individually. The parade was led by the kingly Viking and his stock, and it was the universal opinion that a finer family show of colts and trotters was never made in the North. Viking looked in far better form than he did at the New England Breeder's meeting, where he trotted eight heats on sheer pluck and won one of the greatest stallion races on record. It was probably the last race he will ever appear in, though it is not unlikely that he may be fitted some day to beat his record. Mr. Foster, his owner, believes that he is in shape to do this at the present time. As the stock passed in review before the grand stand, the animals were described by George G. Brown, of Tilton. The blue ribbon winners attracted especial notice.

Among those who enjoyed the exhibition was the Hon. Chas. E. Tilton, to whom the New Hampshire Horse Breed-

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ers' Association is under many obligations for kindnesses rendered. He occupied a seat in the grand stand with Hon. P. C. Cheney, vice-president of the association, and as animal after animal was led down the track and shown he expressed the highest gratification and delight. The spectacle of horseflesh was a revelation to him, as it was to everybody else present unacquainted with the advancement New Hampshire has been making during the past few years in horse breeding. The parade occupied about an hour and was the leading feature of the meeting. Several hundred people enjoyed the sight, which would have been witnessed by as many thousands Wednesday if the weather had been fine.

The races were called as soon as the parade ended. George M. Stevens, of Lancaster, and George E. Brown, of Tilton, acted as judges. There were three events, and they all resulted in straight heats. The five-year-old stakes brought out the fast and stout mare, Etta K., owned by that enterprising breeder and liberal horseman, Sam Hodson, of Meredith, the speedy Sylvester K., and the sweet mare, Ethel Lambert. Etta K. was the favorite, but it was not her day. N. J. Stone had Sylvester K. right on an edge, and the finish he made with him in the first heat has not been equaled on Tilton and Franklin park for many a day. It electrified the crowd. He beat the mare three straight and trotted the third mile in 2.32½, lowering his record. Ethel Lambert had trotted in races on the two preceding days, and as distance was waived she was laid up all the way through. The summary:

Lake View Stock Farm Stakes for Foals of 1886. Value, $175.

Sylvester K., b. g., by Lambertus, N. J. Stone, Manchester	1	1	1
Etta K., b. m., by Douglas, Sam Hodson, Meredith	2	2	2
Ethel Lambert, ch. m., by Harry Lambert, C. G. Blanchard, Concord	3	3	3

Time, 2.34½, 2.37, 2.32½.

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The stallion race was the second event. This had three starters and none of them seemed to be able to trot much. John B. Clarke was the favorite and was a winner in slow time. He has been acting well in his work, going a mile a few days ago in 2.41, but he was not in shape to-day. The others were even worse off. The winner is a great gaited colt and in somebody's hands ought to make a trotter. The summary:

Guaranteed Purse, $300, for 2.40 Stallions Owned by Members.

John B. Clarke, g. h., by Mambrino Wilkes, George A. Brown, Contoocook	1	1	1
Harry Lambert, b. h., by Daniel Lambert, C. G. Blanchard, Concord	2	2	2
Fleetwood, b. h., by Stockwood, C. C. Kenrick, Franklin Falls	3	3	3

Time — 3.05, 2.55¾, 2.56½.

The 2.45 class wound up the meeting. Gracie was a big favorite in this and won as she pleased. Homer Wilkes behaved badly and disappointed his friends, who had played him for second place, Country Boy beating him out. The summary:

Guaranteed Purse, $300, for 3.00 Class.

Gracie, b. m., by Redwood, I. W. Springfield, South Wolfeborough	1	1	1
Country Boy, b. g., by Highland Lad, L. E. Marston, Pittsfield	2	2	3
Homer Wilkes, g. g., by Mambrino Wilkes, E. F. Wilson, Manchester	3	3	2
Keplar P., b. h., George Hall, Concord	4	4	4

Time — 2.42½, 2.40, 2.39½.

All purses and premiums will be paid promptly by the treasurer of the association, John S. Blanchard, of Concord. Many received their money to-day. Bad weather hurt the

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financial interests of the meeting, but the association is not discouraged. It will hold another meeting next year, a month earlier in the season, and will try and surpass the splendid show just closed. Everybody proclaims this meeting a success and of immeasurable value to the horse breeding interests of the State.

W. C. CLARKE,
Secretary.

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BULLETIN NO. 11.*

FEEDING EXPERIMENTS WITH PIGS.

PART I.

The work reported in this bulletin was designed to show something of the feeding or pork-producing value of skim-milk, a matter of no small importance in connection with

*The following bulletins have been issued by Director G. H. Whitcher, of the Experiment Station, since our previous report was made, and are of such value that we continue the practice of publishin them entire.

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dairy farming. Within our State to-day, there are probably 100,000 cows, producing 300,000,000 pounds of milk, of which about three fourths, or about 225,000,000 pounds, is made into butter. Now, on an average we get not far from eighty per cent of the whole milk as skimmilk, consequently the annual quantity of skimmilk that the farmers of New Hampshire have to dispose of is 180,000,000 pounds, and if this is worth twenty-five cents per hundred it represents a value of $450,000.

While the original plan of these experiments covered only the financial side of the question, later it was found desirable to conduct digestion experiments to determine just how much of the food eaten was actually utilized by the pigs. This work was put into the hands of the Station chemist, Professor Morse, whose report is to be found in Part II of this bulletin.

The six pigs selected for this work were bought of a neighboring farmer, August 24, 1889, at which time they were six weeks old. While of no particular breed, they evidently had a good proportion of Chester White blood, and proved rapid growers, and were remarkably uniform in shape and weight.

August 24 each pig was marked and his weight recorded, and at the same time they were divided into two lots, as follows:

No. of Pig . .	1	2	3	
Lot 1, live weight Aug. 24,	28	25½	28½	Total, 82
No. of Pig . .	4	5	6	
Lot 2, live weight Aug. 24,	26	32½	25	Total, 83½

During the preparatory period, from August 24 to September 3, each lot received daily thirty pounds of skimmilk, and at the last named date lot 1 weighed 96½ pounds, while lot 2 weighed 106 pounds.

PLAN OF THE FEEDING WORK.

To place the two lots on as equal a basis as possible it was decided that each should be fed a like amount of digestible matter daily — that is, the total amount of digestible albuminoids and non-albuminoids in the two rations should be as nearly alike as possible — but in one case the source of this

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digestible matter should be skimmilk and corn meal, while in the other it should be corn meal and middlings, with water added. Of course the only possible basis upon which to compute such rations was the "feeding standards" and "feeding tables," and to utilize these it was necessary to assume that the skimmilk, corn meal, and middlings were to be of average quality and digestibility. Luckily, subsequent analyses of the foods used and determination of digestibility, did not show enough variation to affect the results in any way.

The amount of food required was estimated each week, from Wolff's "feeding standards," with a slight modification as to quantity. For one hundred pounds live weight there was fed daily an amount of food which would contain, for

Lot 1. { .536 pounds albuminoids.
3.36 pounds non-albuminoids.

Lot 2. { .53 pounds albuminoids.
3.33 pounds non-albuminoids.

Wolff's standard is { .40 of albuminoids.
2.40 of non-albuminoids.

The ratio of albuminoids to non-albuminoids (nutritive ratio) is practically the same as Wolff's, but the total digestible matter daily for one hundred pounds live weight is 3.86 pounds as against 2.80. This excess is apparently greater than is actually the case, owing to the way in which the live weight was estimated in advance.

The pigs were weighed individually each week, and the ration for the succeeding week was figured, not on the actual weight at the commencement of the week, but upon an estimate of what each lot would weigh at the end of the week; this was done by adding to the actual weight an amount equal to the average gain of both lots for the preceding week; as a matter of fact, therefore, the quantity of food was always figured for a greater live weight than actually existed. A better way, doubtless, and one adopted in another experiment, would have been to have added one half of this gain, thus figuring the ration on approximately the average live weight for the week. On the other hand, it may be reasonably urged that so long as the food was consumed without waste it was

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evident that these particular pigs, at least, were so constituted that they could handle more than Wolff's standards call for.

HOW THE RATIONS WERE COMPUTED.

As already mentioned, it was decided to make the grain ration a mixture of equal parts of corn meal and wheat middlings, as this mixture would have a nutritive ration of 1 : 6.5, which was exactly what was desired. A sufficient amount was then taken to meet the requirements for the live weight involved, estimated as above explained.

The lot not having the mixed grain were to have such a mixture of skimmilk and corn meal as should give exactly the same amount and proportion of digestible matter. It was found that one part of corn meal and two parts of skimmilk gave nearly the right proportion, or nutritive ratio, and in general this was the combination fed.

As the feeding progressed, samples of the foods were analyzed, and when it was observed that the skimmilk ration invariably gave the greater growth, the digestibility of each constituent of the food was determined, as reported in Part II, where will be found the "Composition of Feeding Stuffs," Table I, page 11; "Composition of Dung," Table II, page 12; and "Digestion Coefficients," Table IV, page 13.

The following table (I) is computed from the total composition and the digestion coefficients given in Part II, and is in the form which I have used for the last six years in feeding tables; the first column gives the digestible albuminoids, the second the non-albuminoids made up of digestible nitrogen-free extract, fibre, and fat, the latter multiplied by 2½ to place it on a starch basis:

TABLE I.

100 pounds.	—Digestible— Albuminoids.	Non-albuminoids.	Nutritive ratio.
Corn meal contain . .	7.92	76.91	1 : 9.7
Middlings contain . .	14.82	64.30	1 : 4.3
Skimmilk contain . .	3.29	5 82	1 : 1.8

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TABLE II. — Lot 1.

Period.	Week.	Live weight.	DAILY RATIONS. Skimmilk.	Corn meal.	Middlings.	Water.	Gain, live weight.	Gain per 100 lbs. live weight.	Ditto, averaged for period.	Cost of 1 lb. of gain, assuming skimmilk to be 25c. per cwt.	Ditto, averaged for period.	Digestible dry matter per 100 lbs. growth.
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.			lbs.
1	1	96½	7	3½	....	....	12	11.7		.0306		
Sept.	2	108½	9	5	....	....	22	18.4	15.6	.0230	.0258	179
3-24.	3	130½	12	6	....	....	24	16.8		.0263		
2	4	154½	....	4	4	10	19	11.6		.0340		
Sept. 24	5	173½	....	5	5	10	22	11.9	11.5	.0365	.0380	271
to Oct. 15.	6	195½	....	6	6	15	22½	10.9		.0430		
3	7	218	17	10	....	....	30½	13.1		.0327		
Oct. 15	8	248½	19	10½	....	....	28	10.7	11.7	.0375	.0350	243
to Nov. 15.	9	276½	22	11	....	....	33½	11.4		.0344		
	10	310	....	9	9	*30	34½	10.4		.0420		
4	11	344½	....	10	10	34	28½	7.9		.0565		
Nov. 5 to	12	373	....	10½	10½	38	30	7.7	7.6	.0562	.0560	398
Dec. 10.	13	403	....	10½	10½	38	27½	6.6		.0615		
	14	430½	....	11½	11½	37	27½	6.2		.0672		
	15	458	36	17	....	....	46	9.6		.0396		
5	16	504	36	20	....	*2	49½	9.4		.0410		
Dec. 10	17	553½	37	22	....	3	51½	8.9	8.5	.0425	.0434	304
to Jan. 14.	18	605	37	22	....	3	42	6.7		.0620		
	19	647	39	23	....	4	53	7.8		.0432		

TABLE II. — Lot 2.

		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.			lbs.
1	1	106	....	2½	2½	6	8	7.3		.0503		
Sept.	2	114	....	3½	3½	8	16½	13.5	13.1	.0342	.0316	225
3-24	3	130½	....	4	4	10	26½	18.5		.0243		
2	4	157	12	6	....	....	16	9.7		.0394		
Sept. 24	5	173	14	8	....	....	31½	16.6	15.3	.0256	.0270	189
to Oct. 15.	6	204½	16	10	....	....	42	18.6		.0233		
3	7	246½	....	7	7	16	25	9.7		.0452		
Oct. 15	8	271½	....	7½	7½	18	24½	8.7	9.2	.0493	.0460	328
to Nov. 5.	9	296	....	8	8	20	29	9.3		.0445		
	10	325	27	14	....	*6	50½	14.4		.0287		
4	11	375½	30	16	....	7	40½	10.2		.0406		
Nov. 5 to	12	416	33	18	....	8	41	9.5	11.1	.0448	.0363	252
Dec. 10.	13	457	33	18	....	8	41	8.6		.0448		
	14	498	36½	19½	....	8	68	12.8		.0295		
	15	566	....	14	14	46	34½	5.9		.0650		
5	16	600½	....	15	15	45	45	7.2		.0537		
Dec. 10	17	645½	....	16	16	48	41½	6.2	5.3	.0620	.0633	450
to Jan. 14.	18	687	....	16	16	48	27½	3.9		.0936		
	19	714½	....	8½	8½	25	25½	3.5		.0502		

* Extra water in both lots.

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In Table II are given the details of the rations used; the first, second, and third periods are of twenty-one days each, while the fourth and fifth are of thirty-five days each. The lots were alternated from the skimmilk and corn meal ration to the mixed grain ration, and *vice versa* at the beginning of each period, thus equalizing any variation in the natural thriftiness of the two lots.

Table II is arranged as follows: Commencing at the left, the first column gives the period and date covered; the second column gives the number of the week since the experiment commenced; the next four columns give the kind and amount of food fed per lot daily; the gain per week for each lot comes next; then the gain figured to one hundred pounds of live weight, followed by the same averaged for the entire period; in the next column is given the cost per pound of growth for each week. In order that this might be figured out it was necessary to assume some value for skimmilk, and I have taken this at twenty-five cents per hundred pounds; following this is the average per period.

This table contains the more important results of the experiment. The most noticeable thing about it is the superiority of the skimmilk and corn meal ration over that made up of corn meal and middlings, notwithstanding the fact, as will be shown later, that the former ration did not contain as much digestible matter as the latter.

TABLE III.

Period.	Lot 1.				Lot 2.			
	Average gain per week for each 100 lbs. live weight.		Average cost per pound of growth.		Average gain per week, for each 100 lbs. live weight.		Average cost per pound of growth.	
	Skim-milk.	Mix'd grain.	Skim-milk.	Mix'd grain.	Skim-milk.	Mix'd grain.	Skim-milk.	Mix'd grain.
	lbs.	lbs.	cts.	cts.	lbs.	lbs.	cts.	cts.
1	15.6		2.58			13.1		3.16
2		11.5		3.8	14.9		2.70	
3	11.7		3.50			9.2		4.60
4		7.8		5.6	11.1		3.63	
5	8.5		4.34			5.3		6.33

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Table III is condensed from Table II for the purpose of showing that this superiority is a decided one, both as to rate of growth and cost of growth.

A glance will show that the growth per one hundred pounds of live weight is much larger in each lot when the ration is skimmilk and corn meal than when it is corn meal and middlings, and it is likewise noticeable that this gain decreases with the same ration as the pigs grew older. It is also evident that the cost of growth follows the same rule, being lowest when the gain is greatest.

The following averages were obtained during the one hundred and thirty-three days covered by this work:

	Lot 1.		Lot 2.	
Average weekly gain for 100 pounds live weight, on skimmilk ration .	**11.3**	10.4	**12.5**	10
on mixed grain ration	9.2		8.5	
Average cost of 1 pound of growth, on skimmilk ration. . .	**3.9**	4.4	**3.4**	4.5
on mixed grain ration . .	5.1		5.3	

The figures for the skimmilk and corn meal ration are put in black faced type, and it is at once seen that the rate of gain was unmistakably greater on the skimmilk and grain than on grain alone, the percentage in favor of the former being 23 and 47 on lots 1 and 2 respectively, while the cost of growth on lots 1 and 2 was 1.2 cents and 1.9 cents greater per pound when the food was mixed grain; this difference is well worthy of careful consideration. With grain costing, as this did, $20 per ton for corn meal and $26 for middlings, such pigs as these were, cannot be fed without loss when pork sells at four cents alive, or five cents dressed.

With skimmilk, however, the case is different, for two reasons:

First, less "raw material" — that is, digestible matter — is required to produce a pound of growth, as shown below:

DIGESTIBLE MATTER PER HUNDRED POUNDS OF GROWTH.

Average digestible dry matter required to produce 100 pounds gain:

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	Lot 1.	Lot 2.
Skimmilk and corn meal . .	242	220½
Meal and middlings . . .	334½	334½
Average for entire time . .	279	288¾

Secondly, because with skimmilk and corn meal a greater quantity of food can be handled daily. Thus, by both of these factors the time required for producing a two hundred pound pig is reduced very materially. This point is not sufficiently appreciated by many who feed pigs. With the present prices there is but one way in which pork can be produced at a profit, and that is by producing a two hundred pound pig in the shortest possible time.

We see from Table II that the cost of growth and the amount of food required to produce one hundred pounds of growth, increase as the pigs grow older, and it would have been much more profitable to have sold them when averaging one hundred and seventy-five pounds each, than when averaging two hundred and forty pounds.

Thus far we have, for convenience, figured all results on the assumption that the skimmilk used was worth twenty-five cents per hundred pounds.

TABLE IV.

Period.	Lot 1.					Lot 2.				
	Value of gain for period, at 4 cts. per lb.	Value of corn meal fed.	Value of skimmilk by difference.	Amount of skimmilk fed.	Value of skimmilk per 100 pounds.	Value of gain for period, at 4 cts. per lb.	Value of corn meal fed.	Value of skimmilk by difference.	Amount of skimmilk fed.	Value of skimmilk per 100 pounds.
				lbs.	cts.				lbs.	cts.
1	$2 32	$1.01	$1.31	196	67					
2						$3.58	$1.68	$1.90	294	64½
3	3.68	2.20	1.48	406	36½					
4						9.64	5.98	3.62	1,116	32½
5	9.68	7.28	2.40	1,295	18½					
Total average	15.68	10.49	5.19	1,897	27⅛	13.22	7.66	5.56	1,410	39½

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We will now see what its value actually was under the conditions of this experiment, the price of live hogs being four cents per pound, and the cost of grain as previously mentioned.

For our present purpose, we will neglect the first cost of the pigs and note the value of the gain of live weight for each period, where skimmilk was used as a part of the ration.

This table is constructed by determining the value of the gain for each skimmilk period and subtracting therefrom the cost of the corn meal which was fed with the skimmilk, the remainder represents the value of the skimmilk, which divided by the amount, gives the value per hundred pounds. The showing is certainly a favorable one, and with thrifty pigs from twenty to thirty cents per hundred ought to be and can be realized for skimmilk, when live hogs sell at four cents per pound. It must be constantly kept in mind, however, that they must be sold by the time they reach a live weight of from two hundred to two hundred and thirty pounds.

FEEDING WITH GRAIN ALONE.

Table V gives the results of feeding with corn meal and middlings.

TABLE V.

Period.	Lot 1.			Lot 2.		
	Value of gain at 4 cts. per pound.	Cost of grain fed.	Cost of grain per pound.	Value of gain at 4 cts. per pound.	Cost of grain fed.	Cost of grain per pound.
1				$2.04	$1.61	$0.031
2	$2.54	$2.41	$0.038	3.14	3.61	.046
3	5.92	8.29	.056	6.96	11.02	.063
4						
5						
Total average	8.46	10.70	.050	12.14	16.25	.053

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This table seems conclusive, so far as these pigs were concerned, and we are obliged to say that on grain alone there was a loss of more than one cent for every pound of growth.

These results show us that we cannot blindly follow the teachings of feeding tables, for should we so do one of these rations would be as good as the other; but as a matter of fact, while chemically the skimmilk ration was not quite as rich in nutritive material as the grain ration, yet the former was, on an average, thirty per cent more efficient in actual results than the latter.

PART II.

DETERMINATION OF DIGESTIBILITY OF RATIONS.

F. W. MORSE.

The comparative digestibility of the two rations was determined as follows:

One pig from each lot was taken and placed in a box or cage, so constructed that the food would not be wasted and none of the dung would be lost.

The pigs did not seem to mind this confinement and continued to gain in weight as before the beginning of this part of the experiment. Fortunately, the weather was mild and no wide variation in temperature occurred during this period.

The food for each was weighed night and morning, and samples taken at each weighing for subsequent analysis. Equal parts of the morning and evening samples of skimmilk were mixed together and analyzed on the following day, before it became sour. Equal parts of the daily samples of corn meal and middlings were mixed together, and at the close of the experiment a small sample was drawn from each for analysis. By this means the average composition of each food stuff was determined. This composition is given in the following table:

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TABLE I.

	Water.	Dry matter.	Ash.	Ether extract.	Crude proteine.	Crude fibre.	Nitrogen-free extract.
Corn meal	14.22	85.78	1.71	3.35	9.23	1.54	69.45
Middlings	12.30	87.70	3.09	3.89	16.75	2.67	61.30
Skimmilk	90.61	9.39	0.77	0.33	3.29		5.00

The pigs were carefully watched both day and night, and the dung was collected and put into glass jars. The dung was weighed each day, and at the close of the period was placed in a large porcelain dish and dried as quickly as possible, until it was in a condition to be mixed together thoroughly, when a small sample was taken for an analysis.

The composition of the dung of each pig is shown in the following table:

TABLE II.

	Water.	Dry matter.	Ash.	Ether extract.	Crude proteine.	Crude fibre.	Nitrogen-free extract.
Pig A	68 55	31.45	4 41	2.43	6 62	4.28	15.71
Pig B	67.14	32.86	7.11	3.86	8.24	2.93	10.72

During the digestion period, pig A consumed twenty-two pounds and five ounces of corn meal, twenty-two pounds and five ounces of middlings, together with eighty-four and one half pounds of water, and voided ten and ninety-three one hundredths pounds of dung.

Pig B consumed forty-two pounds of corn meal, seventy-seven pounds skimmilk, and twenty-one pounds of water, and voided six and sixty-seven one hundredths pounds of dung. From these figures and the composition of the food stuffs and dung, is calculated the following table, showing the amount

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of each nutrient eaten, voided, and digested; the amount digested being the difference between the amount eaten and the amount obtained in the dung.

TABLE III.

	PIG A.			PIG B.		
	Consumed.	Voided.	Digested.	Consumed.	Voided.	Digested.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Water	90.41	7.49		96.74	4.48	
Dry matter	38.71	3.44	35.27	43.26	2.19	41.07
Ash	1.07	.48	.59	1.31	.47	.84
Ether extract	1.63	.26	1.37	1.87	.26	1.61
Crude proteine	5.80	.72	5.08	6.41	.55	5.86
Crude fibre	.94	.47	.47	.65	.19	.46
Nitrogen-free extract	29.17	1.72	27.45	33.02	.71	32.31

By this table it is shown that pig B, on the skimmilk ration, consumed more food than pig A, and digested more of each nutrient. This difference amounted in all to five and eight tenths pounds of dry matter. He also gained two and twenty-five one hundredths pounds more in live weight than pig A.

The pigs were weighed each day, at the same hour, and showed a continued increase in weight, amounting in all to three and seventy-five one hundredths pounds for pig A, and six pounds for pig B.

Pig A did not eat readily, and on two occasions his daily rations had to be reduced below that originally planned for him. Pig B ate freely at each feeding and consumed the full ration planned for the experiment, and apparently would have eaten more if it had been given him. This fact was probably owing to the greater digestibility of the ration.

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This greater digestibility of the skimmilk ration was noticeable for each nutrient; but especially so for the crude fibre, as the following table of percentages of digestibility will show:

TABLE IV.

	Dry matter.	Ether extract.	Crude proteine.	Crude fibre.	Nitrogen-free extract.
Pig A	91.11	84.04	87.58	5.00	94.10
Pig B	94.93	86.09	91.42	70.77	97.85

To be sure the crude fibre does not occur in large quantities in the food of pigs, yet there was a difference in the dung of the two pigs, apparent to the eye. The dung from pig A was dry and hard, and contained many undigested hulls or scales from the middlings and corn meal, while pig B passed a soft dung.

The nutritive ratios calculated from the actually digested nutrients vary but slightly in the two rations, being 1 to 6.17 for the corn meal and middlings, and 1 to 6.27 for the corn meal and skimmilk.

CONCLUSIONS.

1. For each one hundred pounds of live weight, eight pounds of skimmilk, and four pounds of corn meal make an ample and well proportioned daily ration.

2. In the absence of skimmilk, two and one half pounds of middlings, and eight pounds of water, will give an equal amount of nutritive matter.

3. One hundred pounds of digestible matter in the skimmilk and corn meal ration, was equal to one hundred and forty-six and six tenths pounds, in the corn meal and middlings ration.

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4. The superiority of the skimmilk ration is due in part, doubtless, to its greater digestibility; but still more, in my opinion, to the fact that there is less waste matter — that is, indigestible matter — to be carried through the system, and to the noticeable difference in the character of the dung, mentioned by Professor Morse in Part II of this bulletin. The pigs, on mixed grain invariably grew constipated, while those on skimmilk were not so affected.

5. The cost of a pound of gain on skimmilk and corn meal, was three and six tenths cents; on mixed grain ration, five and two tenths cents.

6. Digestible dry matter required to produce one hundred pounds of gain of live weight on skimmilk and corn meal, two hundred and thirty-one pounds; on mixed grain, three hundred and thirty-four and one half pounds.

7. { Lot 1, when dressed, shrunk 19.6 per cent.
   { Lot 2, when dressed, shrunk 18.4 per cent.

8. Calling skimmilk worth twenty-five cents per hundred, and we get the following balance sheet, on the basis of the cost as given in "Conclusion No. 5":

30 lb. pig, first cost	$2.00
170 lbs. of growth on skimmilk and corn meal at 3.6 cts.	6.12
200 lb. pig cost	$8.12

which equals 4.06 cents per pound.

30 lb. pig, first cost	$2.00
170 lbs. of growth on corn meal and middlings at 5.2 cts.	8.84
200 lb. pig cost	$10.80

which equals 5.42 cents per pound.

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Bulletin No. 12.

FERTILIZER EXPERIMENT.

The fertilizer experiments for the season of 1890 were in part a continuation of similar work, which has been reported on before, and in part a new line of work, relating more especially to the use of manures, prepared fertilizers, chemicals, and ashes on a crop of ensilage corn; I am convinced that there is room for a considerable saving in the purchase of *plant food*, as well as a possibility of more economical uses of manures, and I can only hope that the suggestions given, and the conclusions drawn from the work, will be thoroughly tested by the farmers of the State, for they are of use and value only as they are put to the test on various soils and under existing conditions. Unless tried they are of no value to those for whom the work has been and is being done.

From those who have tested the merits of the combinations first sent from this college in 1885, and not materially modified since that time, there is testimony that convinces me that the general combination recommended for corn is substantially what is required for our soils, and from Massachusetts and Vermont I receive similar testimony; but while every new test adds to the probability of the correctness of my position relative to the need of vastly more potash than our fertilizer manufacturers give us, yet farmers must in the end satisfy themselves by trial on their own soil; and there is no possibility of loss resulting from this trial with every probability of gain.

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TABLE I.

		Number of Plot.																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Kind of Fertilizer.		bu.	lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.	lbs.	bu.		lbs.	lbs.	lbs.	lbs.		lbs.	lbs.	lbs.
	Dissolved bone-black	.....	18½	24¼	14	.....		.....	.....	17½	16½	....		16½	.....	18½	10½		.....	.....	33⅛
	Muriate of potash	.....	3⅜	6	.....	17¼		.....	.....	8¾	5	.....		5	.....	3⅜	9½		.....	22¼	.....
	Sulphate of ammonia	.....	3⅜	.....	7¼	2¾		.....	.....	1	3½	.....		3½	.....	3⅜	3¼		12½	.....	.....
	Ashes	.....	.....	.....	.....	.....		.....	.....	.....	.....	2		.....	.....	.....	.....		.....	.....	.....
	Manure	35	.....	.....	.....	.....		.....	.....	.....	.....	.....		.....	.....	.....	.....		.....	.....	.....
	Stockbridge	.....	.....	.....	.....	.....		26	.....	.....	.....	.....		.....	.....	.....	.....		.....	.....	.....
	Bowker, Hill and Drill	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....		.....	28	.....	.....		.....	.....	.....
	Bradley XL	.....	.....	.....	.....	.....		.....	26	.....	.....	.....		.....	.....	.....	.....		.....	.....	.....
Nothing.							Nothing.						Nothing.					Nothing.			
Analyses.	Phosphoric acid, per cent.	.23	11.4	12.8	10.5	.....	.....	10.7	11.8	10.5	10.5	1.5	.....	10.5	12.4	11.4	7.2	.....	.....	.....	16
	Potash, per cent.	.48	7.0	10.0	.....	43.5	.....	5.0	2.1	16.0	10.0	6.5	.....	10.0	2.0	7.0	20.4	.....	.....	50	.....
	Nitrogen, per cent	.48	2.8	.....	6.8	2.8	.....	4.0	2.5	0.7	2.8	.....	.....	2.8	2.5	2.8	2.8	.....	20	.....	.....

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TABLE II.

	Number of Plot.																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Yield in bushels per acre	238	224	206	114	132	96	194	150	190	234	130	94	186	190	204	220	92	90	124	124
Gain over average of plots with no fertilizer, bushels	144	130	112	20	38	....	100	56	96	140	36	....	92	96	110	126	....	4	30	30
Value of crop, at 50 cents per bushel	$119	$112	$103	$57	$66	$48	$97	$75	$95	$117	$65	$47	$93	$95	$102	$110	$46	$45	$62	$62
Value of gain over plots with no fertilizer	72	65	56	10	19	....	50	28	48	70	18	....	46	48	55	63	....	....	15	15
Value of gain for $1 invested in fertilizer	3 60	6.50	5.60	1.00	1.90	....	5.00	2 80	4 80	7.00	1.80	....	4.60	4.80	5.50	6.30	....	....	1.50	1.50

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CHEMICALS FOR POTATOES.

The coöperative work carried on in 1889 was not continued, except in a single case, as there are few who are willing to devote the necessary time and trouble to the laying out of plots, and more especially to the weighing of the harvested crop. The exception above noted was a series of tests on potatoes, carried on by Mr. S. B. Whittemore, of Colebrook, in the heart of the potato region of New Hampshire, and the results are of interest and value to every man who contemplates purchasing fertilizers for use on this crop.

The combinations of chemicals were the same as those sent out in 1889, and in the following table is given the kind and amount of each chemical used per plot of one-twentieth acre, and also the chemical composition of the mixed fertilizer as it would have shown by chemical analysis:

It will be seen from this table that each form of plant food is used by itself (see plots 18, 19, 20), also in combinations of two with the third omitted (see plots 3, 4, 5), and in addition to these the three forms are combined in varying proportions (see plots 2, 9, 10, 13, 15, 16). Plots 2 and 5 are duplicates, as are 10 and 13.

The Station mixed and sent out all the chemicals, and also the prepared fertilizer, for plot 14, using an amount on each plot which would, at the prices then asked, cost ten dollars per acre. The prepared fertilizers used on plots 7 and 8 were selected by Mr. Whittemore from the local market, and whether the cost was more or less than ten dollars per acre I am unable to say; it is probable, however, that two pounds more of Bradley's XL should have been used, as its selling price is usually the same as that of Bowker's H & D. Two bushels of ashes were used, on the supposition that they cost twenty-five cents per bushel, which is the average price for unleached ashes, and thirty-five bushels of manure were selected because that amount would give what our farmers consider a good dressing, namely, seven cords, or twenty loads, per acre, the cost of this, however, would be twice the cost of the fertilizer used on the other plots, and this fact must

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be kept in mind in comparing results. All the other plots are directly comparable, since there was equal outlay on each.

The lower division of Table I shows the chemical analysis of each form of fertilizer. In the case of the manures and ashes the average of many analyses is taken, and for the prepared fertilizer the average as determined by the Station from samples collected by the Secretary of the Board of Agriculture.

Table II gives the yield per acre; the value of this yield at fifty cents per bushel; also the gain over the average of the four plots with no fertilizer; and the value of the gain due to a dollar's worth of fertilizer of each kind.

That the land on which these experiments were carried on was of uniform quality to start with is shown by the yield of the plots with no fertilizer, these plots being scattered about over the acre:

No. 6, no fertilizer	96 bushels.
No. 12, "	94 "
No. 17, "	92 "
Average	94 bushels.

(SERIES I.) SINGLE ELEMENTS OF PLANT FOOD.

Plots 18, 19, 20, show what each of the forms of deficient plant food were able to produce on this soil: nitrogen alone, in the form of sulphate of ammonia, yielded ninety bushels, an actual loss over plots with no fertilizer; potash alone, in the form of muriate, yielded one hundred and twenty-four bushels; phosphoric acid alone, in the form of dissolved bone-black, yielded one hundred and twenty-four bushels. A gain in each case of thirty bushels.

So far as this series is concerned, we should be justified in concluding that nitrogen was of no use, and that potash and phosphoric acid are of equal importance, but I wish to express my belief that these tests with only one form of plant food are of very little if any use, but as they are a part of almost every scheme of soil testing I have always put in a set, more to conform to the common custom than from any idea that they would teach anything of much importance.

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(SERIES 2.) COMBINATIONS OF TWO ELEMENTS OF DEFICIENT PLANT FOOD.

Plots 3, 4, 5 were designed to show whether either of the three nutritive elements could be dispensed with.

Plot 3, furnished with phosphoric acid and potash, yielded . . . . . 206 bushels.

Plot 4, furnished with phosphoric acid and nitrogen, yielded . . . . . 114 bushels.

Plot 5, furnished with potash and nitrogen, yielded . . . . . 132 bushels.

So far as this series of plots is concerned we have evidence that nitrogen is of the least importance, potash of the most, and phosphoric acid intermediate, and it is clearly the case that phosphoric acid and potash combined give a good crop, well up towards the complete mixtures.

Combining the evidence from series 1 and 2 and we get the following:

				Amount per acre. lbs.	Yield per acre. bu.
(*a*)	Plot 20.	Dissolved bone-black	.	666	124
	Plot 4.	Dissolved bone-black	.	280	114
		Sulphate of ammonia	.	145	
	Plot 3.	Dissolved bone-black	.	485	206
		Muriate of potash .	.	125	
(*b*)	Plot 19.	Muriate of potash .	.	445	124
	Plot 5.	Muriate of potash .	.	345	132
		Sulphate of ammonia	.	55	
	Plot 3.	Muriate of potash .	.	125	206
		Dissolved bone-black	.	485	
(*c*)	Plot 18.	Sulphate of ammonia	.	250	90
	Plot 4.	Sulphate of ammonia	.	145	114
		Dissolved bone-black	.	280	
	Plot 5.	Sulphate of ammonia	.	55	132
		Muriate of potash .	.	345	

Group (*a*), plot 4, shows that substituting 145 pounds of sulphate of ammonia for 386 pounds of the dissolved bone-black in plot 20, decreases the yield 10 bushels; but in plot 3, substituting 125 pounds of muriate of potash for 181 pounds of the dissolved bone-black gives an increase of 82 bushels.

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In group (*b*), plot 5, the substitution of 55 pounds of sulphate of ammonia for 100 pounds of the muriate of potash in plot 19, increases the yield 8 bushels; while in plot 3, replacing 320 pounds of the muriate of potash in plot 19, with 485 pounds of dissolved bone-black increases the yield 82 bushels.

Group (*c*) shows that replacing 105 pounds of sulphate of ammonia with 280 pounds dissolved bone-black added to the yield 24 bushels; and that when 195 pounds of sulphate of ammonia were replaced by 345 pounds of muriate of potash, the increase was 42 bushels.

The three groups show that the greatest yield comes from phosphoric acid and potash (plot 3); the next best from nitrogen and potash (plot 5); the next from phosphoric acid alone (plot 20), and from potash alone (plot 19); the next from phosphoric acid and nitrogen (plot 4); and the poorest from nitrogen alone (plot 18).

(SERIES 3.) COMPLETE CHEMICALS.

In this series three elements of plant food are combined in various ways, the object being to form some idea of the "crop ration" best suited to the conditions of this soil for the potato crop; to this end the method suggested in Bulletin No. 6, of this Station, p. 15, was practised, and in plots 2, 9, 10, 13, 15, and 16, we have combinations of the three fertilizing chemicals which cost the same per acre, but which differ very materially in the proportion of their parts as the per cent of phosphoric acid, potash, and nitrogen, given in Table I, will show.

	Plots.	Analysis.			Yield per acre.
		*P_2O_5.	K_2O.	N.	bu.
(*d*)	2 and 15 . .	11.4	7	2.8	214
(*e*)	10 and 13 . .	10.5	10	2.8	210
(*f*)	16 . .	7.2	20.4	2.8	220
(*g*)	9 . .	10.5	16	0.7	190

Group (*e*) differs from (*d*) by decreasing the per cent of phosphoric acid and increasing the per cent of potash. So

*P_2O_5 means phosphoric acid; K_2O means potash; N means nitrogen.

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far as the average is concerned the yield was slightly decreased by the exchange, but it will be observed that there is a wide difference in the yield of the plots 10 and 13. The cause of this is unknown to me, and while I feel sure that there were some local circumstances which seriously affected plot 13, yet I have averaged it with its duplicate. As a matter of fact, however, I have no doubt but that the yield from group (*e*) should have been much nearer that of plot 10.

On plot 16, however, where still further reduction of phosphoric acid was made and potash increased, the yield was somewhat increased.

Plot 9 is comparable with group (*e*) the object was to decrease the nitrogen and increase the potash; this change caused a very decided loss.

Taking these plots together we may fairly infer that 7.2 per cent of phosphoric acid is ample for the soil under consideration, that 20.4 per cent of potash is better than 7, and that 0.7 per cent of nitrogen is not enough.

There is other evidence that shows that some nitrogen is needed.

Take the following plots:

	P_2O_5.	K_2O.	N.	
9 . .	10.5	16	0.7	yields 190
10 and 13 . .	10.5	10	2.8	" 210
3 . .	12.8	10	0	" 206

Now, if we remember that plots 10 and 13 should, without doubt, have averaged more than 210 bushels, we shall see that the substitution of phosphoric acid in plot 3 for *all* of the nitrogen in 10 and 13 resulted in loss, and exchanging the greater part of the nitrogen for potash (see plot 9), also resulted in loss; we must conclude, therefore, that from one to three per cent of nitrogen is needed on soils where potatoes are the first crop in a rotation, but had corn or any crop which had received manure or a nitrogenous fertilizer preceded this potato crop, it is very likely true that nitrogen would not have been needed.

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(SERIES 4.) PREPARED FERTILIZERS.

This series, made up of plots 7, 8, and 14, were designed to test the relative merit of $10 worth of plant food in the best mixed goods, and $10 worth in chemicals.

No. 7, with 26 pounds of Stockbridge potato fertilizer, yielded 194 bushels.

No. 8, with 26 pounds of Bradley's XL fertilizer, yielded 150 bushels.

No. 14, with 28 pounds of Bowker's Hill and Drill fertilizer, yielded 190 bushels.

The following represents average analyses of these fertilizers:

		P_2O_5.	K_2O.	N.
Stockbridge,	per cent	10.7	5.0	4.0
Bradley XL,	"	11.8	2.1	2.5
Bowker H. and D.	"	12.4	2.0	2.5

As a means of obtaining a comparative statement of the four series, I have given below a table showing the average result from each series:

Series.	Yield. bu.	Gain over no fertilizer. bu.
1. (Single element of plant food)	113	19
2. (Two elements of plant food)	150	56
3. (Three elements of plant food)	210	116
4. (Prepared fertilizer)	178	84
5. (Ashes)	130	36
6. (Manure)	238	144
7. No fertilizer of any kind	94	

There can be no doubt as to the relative efficiency of series 3 and 4, since the amounts used would cost the same. The thirty-two bushels increase represents an absolute gain due solely to the use of mixed chemicals in place of the best of prepared fertilizers.

The cause of the increased efficiency is easily discerned, for I assume that the prepared fertilizers above mentioned were made from good grade materials, and that the plant food, shown by analysis, was available. The following com-

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parison of the average chemical composition of the fertilizers in each series needs little explanation:

	P_2O_5.	K_2O.	N.
Series 3. (Complete chemicals), per ct.	10.2	11.7	2.5
Series 4. (Prepared fertilizer), per ct.	11.6	3.0	3.0

The conclusion is fully warranted that more potash is needed than the prepared fertilizers furnish.

MANURE AND CHEMICALS COMPARED.

On plot 1 manure was used, as has already been stated, at the rate of seven cords, or $20 worth, per acre. That is, twice as much in cost as of either of the fertilizers, and while the yield is the largest of any plot, it is only four bushels ahead of plot 10; and if we compare the value of the gain per one dollar of fertilizer, as in the last part of Table II, it will be seen that one dollar invested in manure gave only an increase worth $3.60, while one dollar invested in complete chemicals gave an increase worth $5.80, and one dollar invested in the best combination (plot 10) gave an increase worth $7, and one dollar invested in prepared fertilizer gave an increase worth $4.20.

Here are figures well worth careful consideration, and they do not stand alone, for in Bulletin No. 10 will be found the report of a duplicate series, made in 1889 by the same party, which shows the same general results, demonstrating the value of such tests when properly carried out.

For the purpose of showing the composition of the fertilizer producing the best results, I have selected those giving the three highest yields as well as the one giving the highest, both from the experiments of 1889 and 1890, and have given below the chemical composition:

		1889.	1890.
Best 3 yields,	P_2O_5, per cent	11.6	9.7
	K_2O, "	7.1	12.4
	N, "	2.3	2.8
Best yield,	P_2O_5, per cent	12.8	10.5
	K_2O, "	10.0	10.0
	N, "		2.8

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CONCLUSIONS.

The above results so fully confirm previous observations, that I shall simply reprint the conclusions given in Bulletin No. 10, of this Station, p. 12:

1. Chemicals when properly mixed can fully take the place of farm yard manure as a source of plant food.

2. Chemicals when properly mixed can and do give greater increase of crop than commercial fertilizers.

4. The average chemical composition of fertilizers for New Hampshire should be phosphoric acid, 9 to 11 per cent; potash, 9 to 15 per cent; nitrogen, 2 to 4 per cent, whereas, the fertilizers offered to us in the market, average phosphoric acid, 11 per cent; potash, 2.5 per cent; nitrogen, 2.5.

HOW TO GET CHEMICAL FERTILIZER.

Dissolved bone-black, containing 16 per cent of available phosphoric acid; muriate of potash, containing 50 per cent of actual potash; and sulphate of ammonia, containing 20 per cent of nitrogen, are all of the substances required for preparing such fertilizers as will give the best results. These can be bought of any wholesale dealer in, or manufacturer of, fertilizers. They are perfectly harmless substances, as easily and safely mixed as corn meal, shorts, and middlings.

The quantities required per acre will, of course, vary, but from Table I, we may easily get the amount that was actually used per acre on any given plot, by multiplying the quantities given in the table by twenty, for example:

Plot 10 gave best yield; there was used on this at the following rate per acre:

Dissolved bone-black . . .	330 pounds.
Muriate of potash	100 "
Sulphate of ammonia . . .	70 "
	500 pounds.

For the third time I will reprint the combinations which have now been tested for the past five years:

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(Also for potatoes on land where no manure has been used for many years.)

Dissolved bone-black	325	pounds.
Muriate of potash	100	"
Sulphate of ammonia	75	"
	500	pounds.

POTATOES.

(Following a manured crop.)

Dissolved bone-black	340	pounds.
Muriate of potash	160	"
	500	pounds.

I would only ask the farmers of New Hampshire to try these combinations, even if at some trouble and extra expense, for I am certain that on by far the greater part of our soils, such mixtures will prove superior to the prepared goods as now compounded.

Bulletin No. 13.

HARDNESS OF BUTTER: THE EFFECT OF FOOD UPON.

A. H. WOOD AND C. L. PARSONS.

It is now commonly admitted that the composition of milk is mainly determined by the breed and individuality of the cow, and that the effect of any normal food upon the percentage of fat contained in the milk is very slight, hence the problem of feeding is, to the milk producer, narrowed to finding the food that will cause his herd to yield the greatest amount of milk at the least cost without injury to the health of his cows. To the maker of butter, however, the problem is still a very broad one; for even if the fat contents of the milk be practically constant and he be able to obtain the maximum quantity

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of butter, it may fall far short of the highest quality, on account of the effect of the food upon the composition of the butter fat.

That the composition and characteristics of butter fat are affected by the food of the cow is not new, in fact, it is a matter of common observation and remark; but, without doubt, in many cases greater changes in the quality of butter are attributed to changes in foods than the facts justify.

The study of the effect of foods upon the resulting butter is an important and difficult one, and this bulletin is intended only as a contribution to what has been, and an indication of what may be, learned in this direction.

Within the last few years gluten meal has come into extensive use as a food rich in albuminoids; and as a milk producing food has proved itself one of the best.

As gluten meal is a by-product in the manufacture of glucose from corn and contains all the substance of the original corn, with the exception of the bulk of the starch, it might be expected that it would have a similar effect upon the character of the butter fat when fed to cows in a normal ration.

To test the relative effect of corn meal and its by-product, gluten, in this direction, the following work was carried out: Eight cows were divided into four lots of two each, and were fed alternately upon rations having corn meal or gluten meal as the leading constituent. Each ration was fed continuously for two weeks and the milk given on the last two days in each period was taken to test the effect of the food upon the churnability of the resulting cream, both in regard to time and thoroughness of churning, and also its effect upon the hardness of the butter, its melting point, and its volatile acids.

The cream was obtained from all lots by the use of De Laval hand separator, and allowed to stand twenty-four hours before churning. The cream was apparently sweet when churned, and therefore lower temperatures were maintained than where acid cream is used. Samples of the buttermilk and butter were analyzed, and the comparative hardness of the butters determined by means of the method hereafter described.

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In Table A, the black-faced type indicates gluten; the common type, corn meal. The various rations are indicated as 1a, 2a, 6a, and 7a, and were made up as follows:

	1a lbs.	7a lbs.	2a lbs.	6a lbs.
Ensilage . .	44	44	44	44
Hay . . .	6	6	6	6
Corn meal . .	0	6	1	5
Middlings . .	3	3	3	3
Gluten . . .	6	0	5	1
Nutritive ratio	1 : 5.2	1 : 9	1 : 5.6	1 : 8

Reference to Table A will show that these four lots of cows were alternated upon these rations, which were constant so far as coarse fodder and one third the grain ration were concerned, and that the substitution of gluten, either wholly or in part, for corn meal, had a marked effect upon the characteristics of the butter fat, decreasing its churnability and softening the product. We would not discourage, on this account, the feeding of gluten to cows, for it has proved itself to be of much value as a milk-producing food, both at this Station (see Bulletin No. 9) and elsewhere. We can only caution against its excessive use with cows that naturally produce a somewhat soft quality of butter, and suggest that mixed with cotton-seed it may very likely be of great advantage, since it may be seriously questioned if cotton-seed in the winter season may not act too strongly in the opposite direction, producing a butter that is too hard.

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TABLE A.

Lot.	Period.	Ration.	Nutritive ratio.	Churning temperature, degrees F.	Time churning, minutes.	Fat in butter milk, per cent.	Hardness of butter, mm. of penetration.	Melting point of butter, degrees C.	Volatile acids equal to — c. c. decinormal $(OH)_2$.	Water in butter, per cent.
A	1	1a.	1 : 5.2	55–56½	11	1.75	8.4	33.8	32.9	9.14
	2	7a.	1 : 9	56–59	15	.54	6.5	32.4	31.9	9.49
	3	1a.	1 : 5.2	53–56	225	1.30	11.7	33.2	29.9	9.20
	4	7a.	1 : 9	52–56	65	.34	6.4	34.0	26.7	9.00
B	1	7a.	1 : 9	55–59	35	.33	4.5	35.5	33.0	9.18
	2	1a.	1 : 5.2	56–56½	20	.96	10.9	32.1	31.7	8.87
	3	7a.	1 : 9	52–56	80	.62	4.9	34.2	29.2	10.00
	4	1a.	1 : 5.2	53–56	11	1.31	7.7	36.5	25 1	10.83
C	1	2a.	1 : 5 6	55–57	15	1.56	7.9	34.7	30.4	9.33
	2	6a.	1 : 8	55–59	30	.58	7.5	33.2	31.6	9.01
	3	2a.	1 : 5.6	52–56	40	1.05	7.3	33.6	31.4	9.66
	4	6a.	1 : 8	53–56	30	.53	6.0	33.1	30.0	11.67
D	1	6a.	1 : 8	55–57	21	1.03	7.1	33.3	32.0	8.85
	2	2a.	1 : 5.6	56–59½	15	1.615	7.9	32.4	30.9	9.03
	3	6a.	1 : 8	52–56	4	.51	4.9	33.5	30.3	8.14
	4	2a.	1 : 5.6	52–56	25	1.22	6.6	32.4	29.5	9 80

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TABLE B.

Lot.	Period.	Ration.	Nutritive ratio.	Churning temperature, degrees F.	Time churning, minutes.	Fat in buttermilk, per cent.	Hardness of butter, mm. of penetration.	Melting point of butter, degrees C.	Volatile acids equal to—c. c. decinormal $Ba(OH)_2$.	Iodine absorption number.	Water in butter, per cent.
G	1	4a.	1:7.2	55-57	16	1.73	8.2	31.7	36.2	.....	9.48
	2	4a1.	1:7.2	56-58	14	.96	6.7	31.5	36.4	.....	9.54
	3	4a.	1:7.2	52-57	32	1.40	7.6	36.1	32.2	.....	8.40
X	1	6a1.	1:8	60	55	.39	8	34.6	29.9	32.4	10.62
	2	6a.	1:8	58	17	.61	9.5	33.1	32.8	32.7	10.06
	3	2a.	1:5.6	53-58	20	....	13	35.7	28.5	38.8	10.93
	4	2a.	1:5.6	49-58	38	1.15	14	34.3	27.8	41.4	14.47
Y	1	2a.	1:5.6	57	18	.57	13.3	32.6	34	36.8	10.03
	2	2a1.	1:5.6	56-59	115	.37	6	38.7	30	31.7	10.49
	3	2a.	1:5.6	54-57	30	....	9.5	36.9	28	37.9	10.22
	4	2a1.	1:5.6	48-58	150	.69	5	37.4	27.6	31.6	12.93
Z	1	4a1.	1:7.2	57	13	1.35	10.7	37.6	27.3	36.8	11.36
	2	4a2	1:7.2	57-60	37	.33	6.5	33	31.6	29	11.46
	3	4a1.	1:7.2	54-57	14	....	8.5	32.6	33.9	36.4	11.13

In Table B the lots are also of two cows each, and the periods two weeks. The treatment of milk and cream was the same as previously described, with this exception, that the cream was raised in shallow pans.

Lot G and lot X, in periods 1 and 2, represent a brief test of ensilage as compared with hay, the rations being as follows:

	4a lbs.	4a1 lbs.	6a1 lbs.	6a lbs.
Ensilage	0	44	0	44
Hay	22	6	25	6
Corn meal	3 5/16	3 5/16	5	5
Middlings	3 5/16	3 5/16	3	3
Gluten	3 5/16	3 5/16	1	1
Nutritive ratio	1 : 7.2	1 : 7.2	1 : 8	1 : 8

In both lots hay apparently produced a harder butter than did ensilage. While as regards churnability lot G favors hay and lot X ensilage. Lot X, periods 3 and 4, is a change from corn meal to gluten and reaffirms the verdict of Table A. Lot Y shows a test of gluten as compared with cotton-seed, the black-faced type representing the cotton-seed periods. The rations as fed were as follows:

	2a lbs.	2a1 lbs.
Ensilage	44	44
Hay	6	6
Corn meal	1	1
Middlings	3	3
Gluten	5	0
Cotton-seed	0	5
Nutritive ratio	1 : 5.6	1 : 5.6

The effect of the substitution of cotton-seed for gluten is very marked in the hardness of the resulting butter, and corroborates the reports from stations in the South as to the effect in this direction of feeding cotton-seed in quite large quantities. *

Lot Z represents a single test of feeding skimmilk to cows,

* See Bulletin 11, Texas, etc.

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and, so far as the butter product is concerned, shows very favorable results. It is, undoubtedly, a good use for skim-milk when not needed for feeding younger animals. The rations were as follows:

	4a1	4a2
Ensilage	36	36
Hay	4½	4½
Corn meal	2½	2½
Middlings	2½	2½
Gluten	2½	0
Skimmilk	0	21
Nutritive ratio	1 : 7.2	1 : 7.2

METHODS USED.

Wollny's modification of Reichert's method was used in the determination of volatile fatty acids; Wiley's method, for the determination of the melting point; and Hubl's, for the Iodine Absorption Number. The hardness of the butters was measured at the same temperature by the depth of penetration of a weighted glass rod falling through a glass tube for a given distance, the penetration being measured in millimeters. The following details are recommended:

The rod should be three millimeters in diameter, twenty centimeters long, and should weigh ten grams. It should be pointed, but the distance along inclined plane, from point to surface of rod, should be no greater than the diameter of the rod. It is easily made by pulling out a piece of glass tubing of the required size and pushing a small piece of cotton down the inside to the point thus made, filling with mercury until the whole weighs ten grams, and finally closing the open end. The tube through which the rod is to fall should be one meter in length, perfectly straight, and of such diameter that the rod will fall perpendicularly through it without vibration and with scarcely any friction. At exactly the length of the rod from the lower end of this tube, a millimeter scale should be attached with the scale reading downward. The butter prepared in the usual way should stand in a cool room several

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days, and then the depth of penetration should be taken at 15½ degrees C., which is about the temperature at which dairy rooms are kept. The hardness of different butters is thus very simply compared, by bringing the tube in a perpendicular position over a plane surface of the butter at some distance from the edge of the mass; fixing the tube in this position, with the lower end lightly resting on the surface; then lower the ten-gram rod into the tube as far as possible with the finger and thumb and let it fall. The penetration can then be read off on the scale. The greater the penetration, the softer the butter. Except on very soft butters, the differences in triplicate determinations are seldom over one millimeter. The results in the tables are averages of several determinations.

INDICATIONS.

The work in this direction is not as yet extensive enough to justify the drawing of conclusions, but our experiments thus far indicate —

1. That gluten meal tends to produce a much softer quality of butter than corn meal or cotton-seed meal, and, other things being equal, tends to lessen the churnability of the butter fat.

2. That with the same cows the hardness of butter depends much more upon the character of the food than upon the nutritive ratio.

3. That ensilage produces a somewhat softer butter than does good hay, but it is also favorable to the flavor and texture of the butter product.

4. That skimmilk has a very favorable effect upon the churnability and quality of the butter fat, and in a single trial apparently reversed the general rule, that the volatile fatty acids decrease as the period of lactation advances.

5. That cotton-seed meal tends to produce an unusually hard quality of butter, and that cotton-seed meal and gluten meal might be used together with excellent results.

6. That contrary to general belief the melting point of butter fat is not a good index of the commercial hardness of

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butter. That while, in general, a soft butter melts at a lower temperature than a hard butter, there is no definite relation between melting point and actual hardness.

7. That no relation can be traced between foods and volatile fatty acids, except in the case of skimmilk. That, usually, hardness and volatile acids vary inversely, hardness generally increasing and volatile acids decreasing, as the period of lactation advances.

8. That the iodine absorption of butter from gluten rations is greater than that of butters from cotton-seed or corn meal rations, and that so far as tried (see Table B) the iodine absorption number follows very closely the hardness of butters.

QUANTITY OF MILK.

G. H. WHITCHER.

The work above reported on by Messrs. Wood and Parsons, was carried on by them in connection with a series of experiments designed primarily to test the relative efficiency of a ration containing a large amount of albuminoids, as against one containing a large amount of starch.

The materials for bringing about this variation in the rations were corn meal and gluten meal, the latter being a waste product from the manufacture of glucose from corn; it is, in fact, corn meal from which a large part of the starch has been removed, it is, consequently, rich in albuminoids and oil.

The following table gives a comparative statement of the average digestible matter in the two food stuffs:

	Corn Meal. per cent.	Gluten. per cent.
Albuminoids	7.78	25.14
Non-albuminoids . . .	71.60	61.90
Nutritive ratio	1 : 9.2	1 : 2.4

Now, as both are made from corn, it follows that whatever difference may be noticed, either in quantity or quality of the product resulting from feeding these grains, must be due to the

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relative proportion of albuminoids and non-albuminoids, and not to any specific differences in the characteristics of the foods, as might and probably would be the case if linseed or cotton-seed were contrasted with corn meal.

In almost every case, with each of the eleven cows, a change from gluten to corn meal — that is, a change from a narrow to a wide nutritive ratio — resulted in a decided falling off in the product, while the reverse change resulted in an equally decided increase. In some cases this variation is obscured by the natural shrinkage which was all the time taking place. The table on page 493 shows the detailed results, each period being for fourteen days.

The following conclusions seem fully warranted, namely:

The proportion of albuminoids to non-albuminoids for the production of milk should not be much wider than 1 : 6.

A nutritive ratio of 1 : 5.2 produced eight per cent more milk than a ratio of 1 : 9.

A ratio of 1 : 5.6 produced nine per cent more milk than one of 1 : 8, and a ratio of 1 : 6 produced thirteen per cent more than a ratio of 1 : 7.

NOTICE.

The position of Station entomologist having been filled by the election of Professor C. M. Weed, we are now prepared to study the various problems connected with insect depredations, which, at the present time, are so disastrous to farm crops.

The Station will gladly undertake to identify specimens, if they are sent to us in some form of package which will insure their arrival in good state of preservation.

Any unusual outbreak of destructive insects will be promptly attended to if the Station is notified.

Address all communications to New Hampshire Experiment Station, Hanover, N. H.

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Nutritive ratio.	1:6	1:7	1:6	1:7	1:5.2	1:9	1:5.2	1:9	1:5.6	1:8	1:5.6	1:8	1:5.6
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Snowflake, 2d	22.4	21.1											
Chinchilla	21.7	20.5	21.2	15.13									
Countess Gazelle					15.2	13.7	14.7	13.5	13.9				
Duchess					32.3	29.0	32.0	27.7					
Pilots Lily						16.6	18.8	16.5	15.6				
Maid of Arlis						17.4	20.7	20.1					
Noethboeo Belle										20.4	21.2	17.8	
Duchess of Hanover									16.4	14.6	14.7	13.8	
Duchess, 2d		25.0	24.4										
Clio									23.7	23.5	25.4	23 2	
Frost										24.5	28.7	28.2	30.09

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Bulletin No. 14.

ENSILAGE IN DAIRY FARMING.

The following bulletin is put out at this time, not because of the original investigation which it records, but more as an aid to those farmers who may be thinking of adopting the silo as a means of increasing the profits of dairy farming, by decreasing the labor item in the production and storing of the required food.

The present outlook for an abundant hay crop, while not positively discouraging, is not especially flattering, and I have no hesitation, after five years of practical experience with ensilage, in saying that no dairy farmer in the State can afford to be without a silo. Even on the so called "natural grass farms" a moderate use of ensilage will prove beneficial. Now, if this is true, and I am sure that time will fully demonstrate that it is, then the more rapidly farmers adopt the system the better, and I am led to issue this bulletin for the purpose of calling the attention of as many as possible to the matter, at a time when it is possible to take immediate steps towards guarding against a shortage in the hay crop.

There is now time to extend the acreage of corn for the silo; even as far north as Hanover we have produced good crops of fair quality when planted as late as June 10, and certainly throughout the greater part of the State, from the first to the tenth of June would not be too late for ordinary seasons.

ADVANTAGES OF ENSILAGE.

1. More actual food material can be produced from an acre of corn than from any other of our common farm crops. Land capable of producing two tons of hay will, as a rule, produce twenty tons of ensilage, having at least twenty-five per cent of dry substance, or actual food material.

40,000 pounds of ensilage equal 10,000 pounds dry matter.
4,000 pounds of hay equal 3,000 pounds dry matter.

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It is safe to say, therefore, that three times as much dry substance may be produced from a given area of corn as from a like area of grass.

2. The cost of a hundred pounds of dry matter is slightly less in corn than in hay.

In our experience we have found the following figures to be substantially true:

100 pounds dry matter in ensilage cost .	42 cents.
100 pounds dry matter in hay cost . .	44½ cents.

3. Green food is especially favorable to the production of milk. The succulent pasture grass in May and June is without an equal as a milk producing food. Mangels and other roots, when fed in combination with dry fodders, are known to have a very beneficial effect, and with ensilage the same has been observed.

In an experiment, carried on at this Station, where hay and ensilage were compared, the following averages were obtained:

Ensilage ration, containing 16.45 pounds digestible dry matter, produced 21 pounds milk.

Hay ration, containing 16.83 pounds digestible dry matter, produced 18.4 pounds milk.

There are those who claim that a pound of digestible matter in one substance is as good as a pound in any and all other substances, and that succulence adds nothing to the value of a food. This I do not regard as proven by practice. In Bulletin No. 11, of this Station, it was shown that one hundred pounds of digestible matter in a ration made up of skimmilk and corn meal was equal to 146.6 pounds of digestible matter in a ration chemically identical, but made up of corn meal and middlings. Practically, there can be no doubt that a pound of food material in the skimmilk ration was superior to a pound in the mixed grain ration, and I believe this was due largely to the favorable condition in which the digestive and assimilative organs were kept by the former ration. This

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being true of skimmilk, I see no reason why pasture grass, roots, or ensilage, may not be likewise more valuable than dried fodders. In fact, I am convinced that foods containing a large per cent of water keep the animal system in such tone that it is able to make better use of the food digested. The efficiency of the steam boiler is very largely affected by the deposit of soot on its flues, not that the boiler or its flues are changed, or that the combustion of the coal is less perfect, but rather, that the heat produced by this combustion is not utilized in steam making. So, although the same amount of food may be digested in one ration as in another, yet the physiological condition of the animal may be such that this digested matter may in one case be utilized to far better advantage than in another. The problem, then, is not one of efficiency of food so much as of efficiency of the machine, i. e., the animal, and it is this animal efficiency which succulent or watery foods increase. The fact exists, that in every day practice two hundred and fifty pounds of average ensilage will fully take the place of one hundred pounds of hay, and in most cases the milk yield will increase on this rate of substitution:

The 250 pounds of ensilage will contain 41 pounds digestible matter, while 100 pounds of hay will contain 51 pounds digestible matter, or 100 pounds of digestible matter in ensilage is fully equal to 125 pounds in mixed hay, and as the proportion of albuminoids to non-albuminoids is not essentially different, this gain must be due to the condition of the two foods.

4. Convenience and cheapness of storing. A corn crop having been produced, it must in some way be preserved for winter feeding. "Topping the stalks," binding and stooking them, leaving the ears and butt stalks to dry out, was at one time the prevalent method, but it involved too much hand labor. Stooking the entire crop as soon as the ears are well glazed, and allowing them to dry for a month or more, husking the ears and mowing away the stalks, reduce the labor, but still there is the cost of husking, grinding the grain, etc., which at the present period of low prices for milk and dairy products

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bears too heavily on the raw material item in the problem. To "reduce the cost of production" is the great problem in agricultural progress, and it must be done by reducing the amount of human labor which enters into farm products. A system of stooking corn in large stooks and leaving them in the field until wanted for feeding purposes has been, and is practiced, to some extent it saves labor, but wastes the crop, and is inconvenient in many ways. Curing the crop and storing are practically impossible on a large scale, since the amount of water to be dried out is very great, and the weather frequently unfavorable; in a small way it can be practiced, but the disadvantages more than offset the advantages. The silo, while not an ideal storage vault, does combine more good points and less bad ones than any method yet devised for preserving the corn crop, for the following reasons:

(*a.*) The farmer who has a silo is about as independent of the weather as any man can be. Heavy rain, it is true, will prevent the storage of ensilage, but, aside from rain, nothing interrupts this kind of harvesting; light rain and showers, while making the work disagreeable, do not put a stop to it necessarily, and when once in the silo all danger of imperfect curing, which so often injures the crop harvested in the old way, is past.

(*b.*) The season is practically lenghtened from two to three weeks, since it is not desirable to have the corn for the silo much past the "boiling or roasting" stage, hence, a variety may be planted for this purpose, which stands no show for ripening, even one year in ten, and as the later varieties of corn are of larger growth and produce more actual food per acre, this gain is by no means unimportant in the more northern parts of New Hampshire. Again, if from unfavorable weather in May, planting is delayed, as already stated, until the first days of June, there is very little risk connected with the crop for the silo, where a crop for husking would be almost certain to be cut off by the fall frosts.

(*d.*) The early date at which the land is cleared makes it possible to either seed down to grass or winter grain. Corn

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for the silo should be stored at about the same at which corn for husking should be stooked, and as the stooked corn must dry out for about a month before husking can begin, it follows, that practically the whole of this time is gained for working the land for the next crop.

(*e.*) The cost of harvesting, provided the crop is planted within reasonable distance of the silo, is reduced to a low point. It is true a large bulk of water has to be handled, and very much depends upon the conveniences for handling; an attempt was made to determine the lowest cost at which ensilage might be handled per acre and per ton with steam power for cutting and elevating into silo, and with an abundance of help, on a two acre field, the average distance of which was seventy rods from the silo, with the following results:

Cutting the corn in field, per acre	$2.00
Loading and drawing to barn	3.75
Cutting and packing in silo	2.40
Use of engine and cutter	1.25
Total cost	$9.40
Yield per acre, 15 tons. Cost per ton	.62¾

The crew consisted of three men cutting, three helping load, three teams, and four men to run the work at the silo. With this crew 24½ tons were put in the pit in 4½ hours.

In 1884, under more favorable circumstances as to distance and location, a seven acre field of corn was harvested with the greatest economy possible, and with the following results per acre:

Cutting and stooking	$2.16
Drawing in fodder and cribbing corn	2.56
Husking	5.00
Drawing corn to mill	1.50
Grinding	1.80
Total	$13.02

While I do not have the exact figures as to the per cent of dry matter in each crop, yet there was not above 6,000 pounds

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in the husked crop, as against 7,500 pounds in the crop put in the silo. Allowing then a loss of twenty per cent for fermentation in silo, and no loss in the stored dry fodder, there would be an equal amount of dry substance to feed out.

One hundred pounds of dry matter at time of feeding out would cost, for harvesting alone, 25 cents in the husked crop, and 15⅜ cents in the silo. Add to this the greater efficiency of the dry matter, pound for pound, and it is evident that from an economic standpoint the silo has the advantage.

It may be argued that these results are exceptionally low, but both are equally so, I think, and are fairly comparable since the labor is charged at the same price in each.

To those who have had experience with both methods of harvesting, it will seem unnecessary to argue that a crop of corn may be disposed of quicker, with less risk on account of weather, and with less actual expenditure for labor, in the silo than in any other way.

KIND OF CORN.

The kind of corn depends upon location. A corn well adapted to southern New Hampshire might be too late for the northern part of the State. The points of importance are: first, to get a variety of corn that will have a large per cent of ears fit to boil by September 5th; second, to get a variety that will produce the largest possible growth, and still meet the first condition.

For a general variety for this State I know of nothing better than the Sanford corn, a white flint corn, intermediate between field and sweet corn. On good soil and with heavy manuring we have produced twenty-five tons per acre, its average product would probably be about fifteen tons. It is a leafy corn, ears heavily, keeps well in the silo, and grows very rapidly.

AMOUNT OF SEED PER ACRE.

Contrary to the practice of many, I have always believed in heavy seeding: one bushel of Southern or Western dent

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corn, fourteen to sixteen quarts of Sanford, and ten to twelve quarts of Northern field corn per acre, have given better results than a less quantity; on poor soil I would use less, but on well fertilized land the above quantities are not excessive when planted in rows three feet apart.

THE SILO.

The day of costly silos is past, and it is this fact alone which enables the rapid extension of this system of storage. A wooden silo keeps its contents with less loss than a stone or cement one, chiefly because of the penetration of air through mortar and cement.

A silo built independent of the barn, having its own frame, roof, etc., can be built for one dollar per ton of capacity, if above seventy-five tons capacity. Contracts can be let for the construction of a one hundred ton silo, the contractor to furnish everything, for $100. If built in a corner of the barn the cost of material and labor will be about one half that sum, but on most farms, where there is lumber, and where much of the work can be done by the farm help, this cost can be reduced almost, if not quite, to an actual cash outlay of $25.

A silo, 16 x 16 x 25 feet, will hold 100 tons. If built in a barn it will require:

40 pieces studding, 3 x 8, 25 feet long .	2,000 feet.
4 pieces, basement sills, 8 x 8, 17 feet long	360 "
Boards for inside walls	3,500 "

The boards should not be over seven inches wide, planed on one side, and the inside course made to break joints with the outside course. Matching the boards is not only useless, but an injury. Common covering boards, free from loose knots, are good enough, and should not cost over $12 per thousand. In many cases the barn frame and studding can be partly utilized, and the above quantity of lumber be considerably reduced. A cement bottom, though not necessary, is desirable.

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Don't say "you can't afford to build a silo," it is just the other way, you can't afford to be without one.

Don't conclude to wait until next year; build one this year; you can easily find time to do it before haying, and then when the early fall frost hits your corn crop you will have a place where it can be put at once and saved.

Don't waste money on a stone or cement silo,— unless you want to for the fun of the thing, — a wooden one is better.

Don't subscribe to the doctrine that ensilage is too watery to be good for anything. Remember that pasture grass in June has more water in it than ensilage has.

Don't plant Western corn, or Southern corn, but get some variety that will perfect the kernels and produce a good number of ears.

Don't forget that you can soon double the supply of fodder by adopting this system; more fodder means more milk, and more milk, more cash.

THINGS TO BE DONE.

Plant two or three acres more of corn as soon as possible.

Select a place in your barn that is convenient, and see how much lumber, and of what dimensions, will be necessary.

Get the lumber, and at odd times put in a silo, and before the fall frosts come, or immediately after, put your corn into it; have it cut into 1½-inch lengths if you can, but if this is too much trouble pack it in whole.

To sum up: DON'T throw this bulletin aside without thinking the matter over, but consider the subject well, and build a fifty ton silo and try it, the results will convince you.

G. H. WHITCHER,
Director.

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MEETINGS OF THE BOARD.

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MEETINGS OF THE BOARD.

ANNUAL FIELD MEETING AT HAMPTON.

The sixth annual field meeting of the State Board of Agriculture was held at Boar's Head, Hampton Beach, August 27, 1891. Owing to unfavorable weather the attendance was not as large as in some former years, but the interest in the meeting and subjects under discussion was never excelled.

At 11 o'clock the meeting was called to order by President Humphrey as follows:

ADDRESS BY PRESIDENT HUMPHREY.

Ladies and Gentlemen:

This is our sixth annual meeting at this place. Heretofore we have always had very pleasant weather, but to-day, unfortunately, it is rainy. The rain, however, should not detract from the spirit of the meeting. We may not have so many here as though it had been a fair day, but the spirit of the meeting should be right without regard to the day. We know that our Methodist friends have good camp meetings and enjoy them supremely because they all pull together and have one idea. Now the Board of Agriculture comes here with the idea of presenting something to you all, ideas that have been found practical and useful in the cause in which we are engaged, and we want you all to take hold and help us.

Last year at our meeting here, the Board of Agriculture in session chose a committee for the purpose of bringing before the Legislature the importance of accepting the Thompson will, as the Board of Agriculture was very desirous that the

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State should get the benefit of it. That committee went to work, and the result is that we are to have an agricultural college down here at Durham. I think I know enough of the Legislature and of the influences there that work against the interest of the farmer, to know that without the force that we had there in our committee and in our State Grange — all working together — we should not have had the prospect of this college in the near future, as we do to-day. I see a distinguished gentleman here, of the State Grange, who was in the Senate, and he did a host of work to obtain that appropriation of $150,000 to put the buildings down at Durham where they are now to go. I will say that if the State Grange and Board of Agriculture never did anything more, they have done enough to immortalize their names, in my opinion, through all generations to come.

But I did not come here to make any argument or any talk. We have speakers here for that purpose. I now have the pleasure of introducing to you the Honorable Joseph B. Walker, of Concord. Possibly you have heard him before. He has always been ready to assist the Board whenever occasion required, and to go into any part of the State, sacrificing his own interest for the cause of agriculture.

THE NATURAL RESOURCES OF NEW HAMPSHIRE.

BY HON. J. B. WALKER.

Some years ago, in the days of our genial Adams, this Board's first secretary, I was engaged by him to deliver at one of its institutes an address upon the subject of Forestry. When he reported this fact to his chief, the present chairman, the latter remarked with some surprise, "Forestry, forestry, nobody cares anything about forestry." To say that this remark put my sweet temper into a state of violent ebullition, is to state the fact in the mildest possible terms. At length, however, when the harmless boiling had subsided, I became convinced that Uncle Moses was right; that, for once in my entire life, I had got ahead of my time, and that while

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I was in one respect like John the Baptist, a voice crying in the wilderness, I was in another, entirely unlike the great forerunner, for he had followers and I hadn't.

But while Mr. Humphrey's remark was true twenty years ago, it is not so to-day; a fact which affords gratifying and important evidence of the growth of our agricultural intelligence.

If New Hampshire were to-day, for the first time, put into our possession, as was Eden into the control of Adam, "to dress and keep it," our first inquiry, doubtless, would be, "what shall we do with it?" To answer as best I may this great fundamental question, so important to all our interests, I am in your presence to-day.

A survey of our State shows that we have a territory nearly two hundred miles long, with a greatest breadth of about one hundred; embracing an area of about six million (6,010,880) acres of diversified surface, lying at elevations which vary all the way from the sea level to an altitude of nearly a mile and a quarter above it, consisting of multitudinous water areas, amounting, according to one official authority, to a million acres, but which I venture to place at one half that number; of much good arable land, and of far more of a rougher kind, which has never yet tolerated culture, and never will.

This is our inheritance, not a great, but a very respectable one. Are we equal to its full development? What shall we do with it? Yes, what shall we do with it? This question is not a new one, first asked in our day. It was propounded by John Mason, the first proprietor of New Hampshire, more than two hundred and fifty years ago. It has been asked over and over again, by the nine or ten succeeding generations which have occupied it, and been variously answered by each in its time. It has come down to us and we cannot evade it. To what uses can we most profitably apply these six millions of acres of which we are now the guardians. This is the great question of to-day.

Some of the earliest settlers of the State said, "establish

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here the fur trade," and it was done; but the catching of beavers, and muskrats, and skunks, and woodchucks, proved a meagre business and was discontinued, for the want, possibly, of a Legislature to attract by suitable bounties game from outside our lines.

Others of the earliest inhabitants, of ardent thirst, perhaps, suggested the making of vineyards, and vines were planted on the sunny banks of the Newitchewannock. But this business proved unprofitable. Modern experience indicates that had they established breweries instead, their ventures might have proved more remunerative. But they probably would have been premature, for there were not then in all New England parched throats enough to swallow a thousand barrels a day.

Mining was proposed, and search was made for precious and useful ores; but in vain. These have never yet been found in plentifulness sufficient to return a new dollar for an old one. The history of mining in this State from 1623 to this year of our Lord, 1891, has been one of uniform failure, and at times of sad personal disaster to those who have pursued it.

Others said, look at these broad forests which everywhere cover the ground; and saw mills were erected upon the Piscataqua and its tributaries. The manufacture of building timber and plank, pipe staves and masts, was commenced and prosecuted with vigor. Ships also were built and in time the lumber interest became the leading business in many localities. Resulting from this came a considerable export trade of forest products to West Indies, Southern Europe, and to our mother country.

But when in time, the importation of foreign corn for the support of the people proved too costly, and its transportation for grinding, to and from the wind-mill at Boston, too onerous, local agriculture was suggested. From that day, down almost to the present, New Hampshire has been regarded as an agricultural State.

Such were the leading answers given by our progenitors

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to this important question. "What shall we do with our domain?" I again put it to you to-day. Let us summon into activity our broadest wisdom and answer it as best we can.

If our friend, Colonel Weare, is present to-day, as he usually is at these gatherings in his neighborhood, he will be likely to say, "agriculture has been our chief support for two centuries. Improve its methods, enlarge its operations and let it remain such." But nature has restricted our farming to less than one half of our territory, we have never plowed more than one sixth of it, we have never pastured more than one quarter of it and we never can, to any profit. Our agricultural operations cannot be much extended beyond their present limit of some two millions and a quarter of acres. To attempt it would be to contend with nature, in an effort sure to prove as vain as it would be foolish. What, therefore, shall we do with our remaining three millions of acres?

A partial answer to that question is sure to be, utilize our ubiquitous water power and establish manufacturing industries in all sections of the State, from Indian Stream to the mouth of the Piscataqua. And in this proposition there is truly much wisdom. While our manufacturing interests are already of great importance, we have but very partially utilized the natural powers offered by the streams to be found in every town in the State.

Some twenty years ago, following the example of her sister State of Maine, New Hampshire made a slight effort to ascertain the locations and amounts of her water powers. A commission was appointed by the governor and council, who made a cursory examination of the subject, and a preliminary report, in 1870, which embodied many important facts.

We learn from this that nearly fifteen hundred streams of varying volumes have been laid down upon our state and county maps, and that, in answer to a circular sent to the towns by the commissioners, asking for the number of water powers in each, returns were received from ninety-one of the two hundred and thirty-eight, or thereabout. These were as follows:

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21	towns in	Rockingham	county	returned	.	48	powers.
6	"	Strafford	"	"	.	30	"
5	"	Belknap	"	"	.	36	"
4	"	Carroll	"	"	.	20	"
9	"	Merrimack	"	"	.	94	"
12	"	Hillsborough	"	"	.	138	"
12	"	Grafton	"	"	.	159	"
4	"	Sullivan	"	"	.	36	"
12	"	Cheshire	"	"	.	132	"
6	"	Coös	"	"	.	58	"
91						751	

The officers of many of these towns accompanied their returns with the remark that they were imperfect, and that they had made but partial lists of the water powers in their several towns. Yet, these averaged eight and a quarter powers to a town. Upon this basis, New Hampshire has nearly two thousand water powers (1,963), a number doubtless much below the actual one.

Those on many of our streams have never been utilized at all. Indeed, thus far, New Hampshire has availed herself in but a small degree of this vast natural force which has been so generously placed at her disposal. The full utilization of it would treble our population, more than treble our wealth, and increase proportionately our industrial and political importance. And yet, we had invested in manufactories in 1880, over fifty millions of dollars ($51,112,263) which yielded an annual product of nearly seventy-five millions ($73,978,028); four or five times that of our farming. Manifestly, we are destined hereafter to become more of a manufacturing than of an agricultural people, if, indeed, we are not already such.

But when we shall have utilized all the water power in the State, and surrounded their sides with prosperous villages, there will still remain some three millions of acres — a strong half of our area — waiting to be improved. What shall we do with these, or rather what can be done with them to render them the most productive? The Almighty has made them for

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something, but for what? This is one half of the whole great question which asks an answer just here and now, with the deep resounding sea on one side of us, the plains and mountains on the other, and the blue vault of heaven bending over us.

In my own humble opinion there is but one sensible answer to this inquiry. The rugged sides of many of our mountains and hills, scattered everywhere over the State, spurn the plough and will yield neither grass, roots, nor grain. Left to themselves however, they will grow wood and timber perpetually, the crop which nature assigned to them when the State emerged from the universal flood which had covered it for a period of whose duration we have no knowledge. That is the crop and the only one which they have borne since man has known them. It is the only one which they are willing to bear. Is it not as well to allow them to do as they will and govern them in the line of their aptitudes?

Early one morning, some years ago, as the late Mr. Thomas B. Leighton sat upon the piazza of his Appledore House, just across this bay at the Shoals, and had taken from his mouth the long horn, with which by gentle tootings, oft repeated, he was wont to arouse his guests, your speaker said to him, "what do you do when they won't wake up?" "I accept the inevitable and let them do as they will." We may wisely, I think, adopt this policy in our treatment of this large half of our domain. For we cannot raise grapes on thorn trees, or figs on thistles, or maize on the shaggy sides of Mount Washington, which will produce trees in abundance and forever.

Now, in case we shall follow the leadings of nature, what may we reasonably expect as the annual return of these rough acres? Each of these three millions ought to produce five thousand feet of timber every forty-five years, amounting to fifteen thousand millions of square feet, worth in the woods, at five dollars per thousand, seventy-five millions of dollars, or one and two thirds millions ($1,666,666) per year, aside from the wood of which no mention has been made. We regard this estimate a reasonable one, and its realization easily possible.

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But look a little farther. When this lumber has reached its ultimate condition by manufacture, its value will have been increased all the way from two or three to a dozen times its original amount, from four or five to ten or fifteen millions of dollars, according to the uses to which it may have been put.

This increase we are now giving very largely to manufacturers outside our lines, by exporting most of our lumber in the log or in partially manufactured forms, and thereby reserving to ourselves but a small fraction of its final value. In other words, we are selling raw material, to which foreigners apply their labor and make fortunes, which we may and ought to secure to ourselves. Communities grow rich but slowly, if at all, by the exportation of their raw products. Our Southern States are learning this lesson very fast, and it will enure to our profit, if we also hasten to do likewise.

Thus far, our woods have yielded us but a small portion of the wealth which they would have done had their capacities been developed as they might have been. Properly managed, where they are now affording occupation to dozens of people and supporting inconsiderable hamlets, they would give employment to hundreds, often to thousands, and convert these hamlets into populous villages and thriving towns.

No great interest in New Hampshire has been so recklessly administered as has that of very many of our forests. The private interests of proprietors only, or rather what they deemed to be such, have been consulted. Formerly, and to some extent now, in the northern part of the State, no trees below certain minimum sizes were or are cut. Under this system, no immature timber is removed, the ground is shaded and its moisture preserved. As a consequence, the young growth is for the most part saved. Fires are comparatively few and their ravages not frequently extensive.

But when, at dry seasons, fires have started upon land from which the entire growth has been removed, their arrest has been well nigh impossible, and every thing upon them, living and dead, has been destroyed. In some cases, the soil itself even has been consumed, and only one sad scene of

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awful desolation has been left to tell the story of mismanagement and neglect.

Last season, the speaker followed up a valley of the White Mountains, some seven or eight miles, which had been thus made frightful. The fire-bleached ledges which flanked its entrance instantly suggested the horrible inscription which Dante, in his "Inferno," has placed above the entrance arch of hell, —

"All hope abandon, ye who enter here."

In this devoted valley, some five years ago, from crest line to crest line of the mountain ranges which wall it in, raged for days devouring flames which consumed every living object upon its surface, save here and there a few trees which the wet ground protected, and the limpid stream which defied their power, — the whole scene there unfolded to view affording a marked example of the effects of drought, denudation, and careless firing combined.

As one wanders through that valley, gazing up and down its desolated sides, and pauses here and there to look upon the pure waters of the stream which divides it, he may realize as he has never done before, the sharp contrast of the blackened horrors of the eternal pit with the "river of water of life, clear as crystal, proceeding out of the throne of God and the Lamb."

But forest fires and denudation do not affect injuriously the forest alone. Their disastrous effects are felt by all our other great industrial interests as well, for these are all more or less inter-dependent upon one another. This remark applies particularly to the agricultural and manufacturing industries of the State. Whatever tends to diminish the water supply or to render it variable and uncertain, is detrimental to these, to a marked degree.

It is a mistake to regard the lakes and ponds of New Hampshire as her great reservoirs. These are her forests. The former are simply catch-basins which hold the stores which the latter have received from the clouds and yield as wanted

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under the gentle but constant pressure of gravity. Fires consume the covering of leaves and mosses which give them their retaining power, and convert their surfaces to blank areas of rock and sand, down which the rains flow as readily as showers down a roof.

Denudation causes them to freeze early in autumn. As a consequence, the entire precipitation of winter rests upon an impervious bed, exposed to evaporation and removal by sun and wind, whereby much of it is lost. Whatever of it remains until spring, melts before the frost leaves the ground, and is converted into torrents which plow the plains with destructive violence, cover fertile fields with barren débris and in headlong haste cause devastation wherever they go.

There is another great interest, not yet mentioned and of a comparatively recent date, which is particularly sensitive to a maladministration of our forests. I refer to the summer visiting interest. This is omnipresent throughout the State. We all of us know more or less about it, but, in the absence of exact statistics, have a vague and inexact idea of its magnitude; yet, our personal observations are sufficient to indicate its great importance and that its future development bids fair to materially increase the value of our real estate, to awaken from their lethargy scores of our now too quiet villages, to improve our social condition, to render more attractive our homes, and afford us local markets where ultimate prices may be realized for the surplus products of our farms and gardens.

Mr. John Lindsey, of Lancaster, remarked some years ago that he remembered when the combined annual receipts of all the White Mountain houses were but twelve thousand dollars ($12,000).

Mr. Edward Hungarford, in the present August number of the "Century," tells us that the White Mountain hotels and boarding-houses now have accommodations for eight thousand persons, and that Bethlehem alone can take care of three thousand. According to his estimate, no less than three hundred and twenty thousand (320,040) persons visit this part of the State every year. But reduce his estimate one third, cut

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the number down to two hundred thousand (200,000), and assign to each an expenditure of five dollars while there (and who can run the gauntlet between "Boots" and the bell boy on one side, and the gentlemanly clerk and the invisible proprietor on the other, for a less sum?), and this number will be found to have left behind no less a sum than one million dollars, besides the amounts paid to railroads and stages for transportation.

The industrious secretary of this Board of Agriculture tells us that, in response to his circulars sent out in 1889, to the hotel and boarding-house keepers in New Hampshire, asking the several amounts of their gross receipts for that year, he received returns aggregating five millions of dollars, five times as much as the value of one of the ordinary annual corn crops of the State.

These figures abundantly show that New Hampshire possesses strong attractions of some kind, which bring within its borders every summer the throngs of men, women, and children that appear among us. What are the attractions? They are not those of Mecca or Lourdes to which multitudes go as pilgrims impelled by religious motives. They are not those of New York or Leadville, nor those of the prairies and the plains, whither men and women go to make money, for visitors do not come here to worship, but to have a good time. They do not come to make money, but rather, to spend it. They are an amiable, well-behaving crowd, with shekels in their pockets which they are willing to part with for a fair consideration. Their numbers increase rather than diminish, and they penetrate every town and almost every school district in the State. What attracts them?

Among the attractions influencing this great throng are:

1. *Pure Air.* When, in July and August, a few weeks of rest and recreation are offered to men and women who spend eleven months of the year in close streets and furnace-heated apartments, they naturally seek God's open country and the fresh air of the hills and mountains, upon whose sides many of them first saw the light. However perfect the ventilation

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which art, guided by science, has introduced to the crowded stores and offices and work shops of our large towns, their atmosphere can never equal that of the highlands of the open country, or of the surf beaten shore where the pulse-beat of the wide ocean invigorates the weakened pulse-beat of man. In these sultry months, New Hampshire offers to all who pine for freshness and space, invigorating breezes brought upon our coast across the arctic current, or strengthening ozone wafted over all our inland country from the great storehouses of the frost king in the far north-west.

2. *Pure Water.* Next to pure air, pure water is essential to the physical welfare of man. When large numbers of people settle upon limited areas, the obtaining of this is a matter of no small difficulty. They are obliged, consequently, as the best to be had, to use waters of inferior quality. But this necessity does not destroy their relish for those, clear as crystal, which our mountains distill from the clouds and transmit everywhere through rock-bedded channels for the free use of all who care for them. It rather increases it.

He who has been obliged to drink the indifferent waters of the great cities will appreciate the worth of our mountain streams. He who has journeyed from Jersey to Florida, over the great sand belt which lines the Atlantic coast, and noticed the turbid character of the streams which cut through it to the sea, will understand the surpassing excellence of the white waters of granitic regions. He who has attempted in vain to allay his thirst with the flat, tasteless waters of the prairies, knows how to value those of our New Hampshire springs. Next to the living waters of eternal life, springing in the regenerated heart of man, are the crystal streams of our hills and mountains.

3. *The Accessibility of our Position is a Third Attraction.* The great Creator of all things has seen fit to place the White Mountains and their ten thousand surrounding hills within the bounds of New Hampshire. That of Mount Washington is the highest mountain summit on the east side of this continent, north of North Carolina. In July and August, ten

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millions of people may reach it between the sunrise and the sunset of a single day. Luxurious railway trains from all directions converge to it, as did the great highways of the Cæsars to imperial Rome.

4. *Love of the Fatherland.* Thousands of choice men and women during the last seventy-five years have gone from the home of their nativity to seek fortunes abroad. Large numbers of them of the first or second generation, attracted to their fatherland by an interest which can be better felt than expressed, come back from time to time to visit kindred and scenes hallowed by the associations of other days. Not a few, with the means which enterprise has gained for them, are building summer homes here and there, all over the State. The love of country life is a characteristic of our race, which, if circumstances allow, is sure to manifest itself in the acquisition and improvement of landed estates. There is no property so precious to a man who has English blood in his veins as a piece of God's fair earth, extending from the point where gravity centers to the realms of illimitable space.

5. *Our Scenery.* But the strongest attraction of any, probably, is that afforded by our scenery. I spent a winter some years ago upon the flat lands about the Gulf of Mexico, and became familiar with the floating bogs of its northern shore, with their gradual elevation to marshes, and still higher sand plains farther inland. They proved exceedingly monotonous and uninteresting. And when, at length, I started homeward upon the great Mississippi and watched, league after league, from the steamer's deck the rich bottoms through which it flows, that depression of spirit which monotony and ennui engender became painful. But when, at length, the little bluff upon which Natches stands came into view, exhilaration succeeded, for it seemed a gate post of Paradise. Indeed, there is very little to interest in the vast sedimentary plains which stretch, in some sections of our country, in all directions to the horizon, reminding one only of former submergence and of pre-historic monsters which the geologist only cares for.

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But when the traveler rises to higher regions, where omnipotent Power has bent the pliable strata of the earth's crest into mountain and valleys, and clothed their sides with forests of perpetual green, an interest is awakened which never flags.

What the Alps and their outlying foot hills are to Switzerland, the White Mountains and their notches are to New Hampshire. Its mountains and valleys have made that little country of central Europe the sanitarium of the continent. If we improve, as we may, our grand opportunities, similar attractions will make our gallant State an important health resort forever.

The sum of what I have thus imperfectly said is this:

We have in our little State of New Hampshire a respectable heritage, affording some half a dozen leading resources, which are valuable, just in proportion to the wisdom and energy with which they are developed.

1. We have an agriculture whose products may be doubled or trebled, if the farmer will but rise to the level of his opportunities.

2. We have water power, of which only a tithe or less has been utilized, sufficient to give us high rank as a manufacturing State, if it be utilized as it may be.

3. We have forests covering half our area, which will yield us annually and perpetually for the simple taking, crops of wood and timber, whose manufacture may give profitable employment to large numbers and increase greatly the population of the State.

4. We have scenery unsurpassed in many respects by that of any other State, which in consequence of its attractive power has just as much a cash value as the soil of our fields or the granite in our quarries. If any one doubt this let him try to buy the summit of Mt. Washington or the old man of the mountain in Franconia Notch.

These and other resources to which I cannot now allude, thus far but partially developed, have hitherto given us a frugal living. Utilized as they may be, they will make us rich.

In a word, I can best illustrate my idea of our present situa-

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tion as owners of this heritage by quoting the remark of a canny old Scotchman who once called upon me to see my farm. As we rode over it he complimented the different sections and I became so inflated with sweet satisfaction as to endanger the button-holes of my jacket. But his parting words produced a sudden collapse and removed the strain. These I have never forgotten. Said he: "You have a very good farm, Mr. Walker, but you don't half carry it on."

THE PRESIDENT: I now have the pleasure of introducing to you the Honorable Charles McDaniel who is master of the State Grange and also member of this Board.

REMARKS BY CHARLES McDANIEL,

MASTER N. H. STATE GRANGE.

Mr. Chairman, Ladies and Gentlemen:

It is with pleasure that I meet you here again to-day and offer you congratulations on the membership of the State Grange of New Hampshire, which to-day numbers fully ten thousand. During the past year perhaps our additions have not been quite so numerous as in some preceding years, yet we have had valuable additions such as we are truly proud of. Such men as the honored president of this Board, another who is the representative of the leading agricultural paper in the State, Senator Gallinger, and many others who have been added to our list within the past year. On account of such men as these we may well feel that we have cause for congratulation.

As an organization of farmers, we feel that it is within our power to do something in the cause that has here been spoken of to-day, in regard to the forests of New Hampshire. We may not, perhaps, have so great an interest in that as the commission that has been appointed by the governor and council, whose honored chairman has spoken to you, yet we are in sympathy with the movement and with the commission, and I hope that the rank and file of this organization may aid in carrying forward the work so successfully begun by that commission.

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Mr. Walker has spoken to you about the natural resources of New Hampshire, its pure air and waters, and of the other attractions of New Hampshire. Perhaps it would be well, for a moment to compare those with some of the attractions in other sections of the country, and then to speak of some of the means, which may be put forth to carry into effect further development of these forests of ours. While he was speaking of the grand panorama spread out in New Hampshire and New England, of this scenery and this landscape that surround us, other places of special interest came to my mind, places that attract the traveler and the pleasure seeker. The Garden of the Gods located in the vicinity of Manitou spring, it is composed of but a small tract of land, only a few acres, and yet in that compass you will find stones of all sizes from the balancing rock of one hundred thousand tons to the minute pebble. It is all in a little compass of its own. There is a great contrast between that and the broad expanse of scenery that surrounds us on every hand, where there is pure water and pure air, as has been said, in abundance, where we have these noble forests and the hills and streams spread out before us in one grand panorama. It is no wonder that people come here to seek health and enjoyment during the summer season.

Now this organization of ours can do something towards developing this work of forestry. We have an organization that is affecting our Legislature, and through the means of this Legislature we hope to develop all the interests that have been spoken of to-day in a more effectual manner than can be done in any other way. In organization there is strength. It is by organization that our agricultural college, which we anticipate will soon be a fact, was brought before the people. On that land that is to belong to the college, we have, I believe, one of the best forests in the State of New Hampshire. It is not of large area, but we have in it a number of pines growing to nearly four thousand feet in a single pine. So the question comes before us now, and before you all: What shall we do with it? Shall we preserve it in its beauty, or shall we cut it down and cultivate the land upon which it is. That is a

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question which I would like everyone of you to consider and form an opinion in your mind; then let us have the benefit of your ideas. There is land there worth not less than sixteen thousand dollars in its present condition, and is it not for us, as farmers of the State of New Hampshire, to consider these important questions, not only as affecting the summer interests, but also the interest of the agricultural part of the State.

The college farm is one of those that has been spoken of very often, or perhaps might be referred to as one of those farms that have been advertised, although I believe this one has not been advertised. It is one of those farms that has been practically neglected for more than twenty-five years. The hay has been taken off from it and sold in the market. Yet I believe we shall establish a college there which will be one that we and all the people of the State may well be proud of. We are deeply interested in this matter and we believe that we shall have one of the best institutions, not only in this State, but in the country. And it is for us to say; it is for this organization we represent to-day, this farmer's organization, to think of, discuss, and devise the best ways and means in regard to this farm of ours and the forest upon it. I say, "this farm of ours" because, although it is not yet ours, it soon will be. Next Tuesday when the governor and council meet it will be a part of the property of the State.

Now let us discuss this question of forestry which has been brought before us by the State Board of Agriculture to-day. Let us discuss it in the one hundred and thirty Subordinate Granges that we have. Let the Subordinate Granges and the State Grange go hand in hand with the Board of Agriculture in this matter, because we have come to be so nearly identified with each other that we are practically one, especially since we have the president of the board with us. We have a common interest in all of these things and I think we can accomplish something in this direction of forestry, if we all take hold.

It has been alluded to by the gentleman who gave us this most excellent address that New Hampshire was a specially

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healthful resort. This reminded me of an incident that occurred when I was on one of our trains. On the same train was a gentleman from Georgia who had come North for his health. He had with him as nurse, a colored gentleman from Atlanta, Georgia, who was a gentleman of very good demeanor, very well educated, and seemingly as perfect a gentleman as you would find anywhere. We were speaking about the scenery, and among other things I asked him in regard to his impression of the country. He went on to give me a description of his feelings, and he said that he was very deeply interested in its pure air, its pure water, its beautiful scenery, and more than all, he said, I am interested in the people that I find here in the North. They are very much different from the people in Georgia. I see here noble men and women, well formed and developed physically, and they are so full of ambition, life, and energy. Now it occurred to me that it was something worth remembering that a colored gentleman, coming from his native South up into the North, should notice this, and it seemed to me that here was a lesson that we should not only cultivate our forests and our agricultural resources but that we should try to improve the crop of men and women that we are raising; for from the grand results that have already been accomplished, we see that we are in a favorable condition for the raising of noble men and women.

In conclusion, I wish to call your attention to the fact that the State Grange has had an additional feature added to it in the past year. You recollect very well that I have spoken to you of the interest that has followed our plan of insurance and our various other enterprises. Now there comes another, and one in which we should all be interested. We are to present it to the public next month. It is the baby show which is to be held at our next fair at Tilton. So we are not only endeavoring to protect the forests of New Hampshire, but we are intending to show some of the best and most attractive babies that New Hampshire can produce.

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THE PRESIDENT: We have with us a gentleman representing another agricultural organization, Brother Connor of Hopkinton, president of the State Dairymen's Association. I wish to say in connection with what Mr. McDaniel has said, that he is one of the trustees of the Agricultural college. I now introduce to you Mr. J. M. Connor.

HOW TO MAKE FARMING A SUCCESS.

BY J. M. CONNOR.

This is my theme. It is the Alpha and Omega of all our discussions. To attain this grand object the Board of Agriculture was instituted. That noble order, the Patrons of Husbandry, came into existence to aid in the achievement of this success. Colleges of agriculture and experiment stations have been founded to aid the work of successful agriculture.

A new avenue is now being opened in the form of summer boarding, another road to success, if rightly conducted. I shall not confine myself strictly to the discussion of this new and rapidly growing industry, which has been so ably discussed by those who have preceded me, but shall consider in a more general way how to make farming a success. I will say, however, that the subject of forestry is not confined alone to the grand old hills and mountains of our State; its application is as broad as the boarding industry itself. There is hardly a town in the State but that is now quite extensively availing itself of this source of income. We are planting trees and vines about our homes, carefully preserving and encouraging their growth by our roadsides; each farmer striving to make his wood lot a grove of beauty and of profit, cutting down the unsightly apple trees, and clearing out the hedges around the fields, to do whatever he can to make his home surroundings attractive, will help on this industry. It will serve a double purpose; it will attract the denizens of the city to his home and community. But above all, such a place will attract the sons and daughters of our homes and lead to a higher estimate of rural life.

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I chose this subject because the larger proportion of the farming community hang their heads in doubt over this problem, because the young and rising generation look for success in life in some other direction than tilling the soil.

I come to you as a practical farmer, starting in life from the lower round in the ladder of fortune and by persistent effort climbing high enough to satisfy a reasonable ambition, and to feel a degree of confidence in the words I may speak.

The world is full of men whose utterances and imaginations exceed their judgment, whose theories while looking plausible upon the surface, serve little or no purpose when brought to the test of practical earnest life work. They may serve some purpose to those who ride over the smooth and shallow water of life, but to those who expect storms as well as sunshine, theories will amount to but very little.

We are living in an age the most remarkable the world has ever known. The past fifty years in the life of this country, in the development of its scientific and mechanical work, has no parallel in man's existence. The contemplation of these wonderful achievements furnishes a tale, stranger than all the fiction which the imagination of man can produce. Within the memory of men now living, all these wonders have been performed. Go to the great centres of commerce, behold this great network of railroads, consider all these stupendous mills and machinery, and do you wonder that the imagination of the rising generation is aroused? Do you wonder that these quiet, unpretending, non-progressing homes, that have stood unmoved these fifty years, are disturbed, disquieted, finally abandoned? From the brown earth comes all the material that keeps in motion all these vast mills, forges, founderies, and workshops, that builds up the colossal fortunes of the railroad power, that fills the immense storehouses, and whitens every sea with its commerce.

Shall an industry that furnishes all the materials to feed and clothe the world, that is the basis of this wonderful wealth and prosperity, be disgraced and dishonored? Is there no way by which the toiler, who from nature's vast storehouse, fur-

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nishes the rough material which is the beginning of every other industry, can be fully compensated for his labors, and can share the honors that mark the progress of this wonderful country?

I shall treat this subject under two heads.

First, how can the individual farmer become successful? and secondly, how can success crown this as an industry?

First, then, as individuals, the thought I would impress upon everyone, whether he is engaged in special or mixed farming, is, that he be fully impressed with the magnitude of this calling. I assert, without the fear of successful contradiction, that no man has the ability to conduct mixed husbandry, with a tolerable degree of success; that no ordinary farmer, with himself and the help usually kept on our farms, has either the physical or the mental ability to succeed by the methods now in practice. You are all familiar with the methods by which large manufacturing establishments are conducted. Every man has his particular line of work, and as he becomes familiar with it the best results are obtained. Let me illustrate. A wealthy syndicate buy up a township of farmers, for the purpose of entering into farming on an extensive scale. They employ a large force of men, erect buildings, employ experts in the different lines of work, and put each man on the line of work for which he is best adapted. In fine, it would be conducted upon just the principle that all manufacturing establishments are now conducted, and upon no other plan could such a concern succeed. I do not propose to take an extreme view of this matter, but we must awake to the fact that the lines of competition are being drawn tighter and tighter, and the farmer who desires to achieve financial success must conduct his business upon a basis approximating somewhat the principles upon which other industries are conducted.

The farmer is, to a large extent, a manufacturer, but he must not attempt the manufacturing of too many kinds of goods at the same time. He has to deal with animal and vegetable life, with all the mysteries that enter into the composition of the soil, the action of light and heat, and the ever varying seasons, in fact, he is in nature's marvelous laboratory, sur-

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rounded by forces and mysteries, in a measure beyond the comprehension of ordinary mortals. Imagine to yourself a farmer with ten thousand dollars invested in a well regulated farm, with flocks and herds, fruits, vegetables, and grasses. He is standing in the midst of all these, ministering to their various needs and conditions; out of all this wonderful mechanism he is to produce the delicious food to support him in existence. Turn now to the ten thousand dollar manufacturer, perhaps engaged in making doors and sash, carriages, or some line of goods. Which of these two men needs the most brain power to be successful?

If, then, it is all one man is capable of, to follow one profession, or one line of work in the mechanical world, what think you of the farmer who attempts to master all lines of work involved in mixed farming?

When we contemplate the tendency of the times, we can arrive at no other conclusion than that the future farmer to be successful, all other things being equal, must follow out some line of work to its greatest perfection. We will enumerate some of these lines of work. Market-gardening, conducted by those who make it a specialty, around our cities and large towns has become a profitable industry. The ordinary farmer cannot compete with him, and should not raise more than enough for home consumption.

The raising of milk is a branch of farming that can only be successful as one adapts his crops to this line, selects animals that are best adapted to the production of milk, and feeds in quantity and quality so as to obtain the best results at the least cost. Take dairying, an industry now commanding such universal attention, upon which there is such a diversity of opinions and of results. No branch of farming better illustrates the blindness and folly of attempting to conduct business without reference to a knowledge and adaptation to its needs.

There are to-day in New Hampshire, in round numbers, not less than 100,000 cows. Three fourths of these cows produce less than 100 pounds of butter each, or its equivalent in milk, annually, as a result of poor breeding, poor feeding, and bad treatment.

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Those who have given dairying any thought, or have had any experience in this industry, will not deny that it is easily attainable to breed and so manage a dairy as to produce from 200 to 250 pounds of butter annually. The difference between a cow that produces less than 100 pounds of butter, and one that produces 225 pounds, is the difference between ruin and success.

But we have considered only the question of pounds, regardless of quality. The difference in value between 100 pounds of inferior butter, and 225 pounds of a superior article, carries the comparison a great way farther. When we consider results so alarmingly at variance, shall we for a moment hesitate as to which of these two methods leads to success? Such fearful odds exist in no other industry, and it is a shame and a disgrace to the farmer, that in this age, when so much knowledge can be obtained concerning a single branch of his labors, that he will allow such a discrepancy to exist.

Let me give you another illustration, that of fruit raising. Hundreds of thousands of dollars have been spent by New Hampshire farmers in purchasing fruit trees and vines, and it is safe to say that nine tenths of this money has been a dead loss. And why? Because the farmer had no time to give for their proper care and cultivation, and knew but little of the true method of conducting fruit growing.

It is safe to assume that three fourths of the fruit grown in this State takes care of itself, without any care or effort on the part of the owner. What are the possibilities of this industry? I need not tell an intelligent audience what the result would be, if a man of ordinary intelligence should devote his time and best thought and make it a specialty. I might carry these illustrations into every department of agricultural life, to show that farming can be and should be made a success.

Because of the lack of business methods I am not imputing to the farmer a lack of intelligence. I have the highest appreciation of his ability. His employment is an isolated one. He is attempting success where no person can succeed. Why do I say this? It is because in this age of competition, of im-

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proved methods and tastes, no man is big enough, no one man has breadth and scope of mind enough, to carry out to their fullest and best results, all departments of agricultural work. Why should not an individual practice law, study medicine, and preach the gospel, at the same time? Simply because no man has the time or the capacity to assume the three professions; if he did he would be judged a lunatic; he would make a botch and a failure of life.

There is a sentiment common among farmers, and it taints all society, that somehow, almost anybody can succeed tolerably well as a farmer, as there is not much about farming but plenty of hard work. Some one has said "any fool can be a farmer." To my mind, if any one entertains such thoughts, he can give no better evidence of his own imbecility than by proclaiming that idea.

One of the strongest elements of success in farming is faith in the soil. As a class, farmers seem to feel that money laid away in the soil is dead property. They do not consider that land reclaimed, pays in a single year a better interest than any savings bank. This is no idle assertion. In my own experience I have demonstrated this over and over again.

The abandoned farms of New Hampshire are so many standing monuments of once faithless owners. Show me a man that re-invests his surplus money in his farm and I want no better evidence that he is on the high road to success. I might point out a long array of conditions that are essential for success. Not the least among them is well directed, earnest labor. There is a mania to-day for soft jobs. This disease when once seated, we mean seated at the corner grocery or the depot, is far more to be dreaded than the tuberculosis. Such creatures are subject to quarantine at the county farm where they will be less contagious.

To make farming a success more depends upon the man than the industry. He must be a live, wide awake, earnest man. He must be abreast with the times. He must be an independent man and not go cringing about thinking he is the mudsill of society. He must not be frightened when clad in

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the panoply of labor if he meets the pomp and glitter of a pampered aristocracy.

Success is not measured alone by dollars and cents. While I believe that farming can be made a success financially by bending all our energies in one direction — and thus alone can we excel, thus alone can any man succeed in any profession or industry — yet our ideas of success should cover a broader field than mere dollars and cents. What should form our true idea of success? It is not alone in multiplying our acres and increasing our flocks and herds. Rather is it not true success that uplifts the man as well as the industry? Can we make successful farming possible without first making the man a success? The stream can rise no higher than the fountain. All his labors, all the products of his hands are the reflections of the man within. He who has a keen sense of the possibilities of dairying, whose mind grasps all the laws that govern breeding, feeding, and handling the products, works no harder than the one who blindly plods along in the use of old methods, who comprehends no system, and acknowledges no law that governs development. Did I say that he works no harder? Rather should I not say that such knowledge of the laws of animal life and the laws that enter into the handling of the products lightens his burden and makes his labor cheerful.

We are not among those who believe, as some would have us, that we can carry on our farms by brain power alone, that we can raise our corn without hoeing, do our churning with dog power, and ride over the rocks and stumps on a sulky plow. "He that by the plow would thrive, himself must either hold or drive." If he commits both to other hands he will need to be more successful in obtaining help than most farmers are.

We must not flatter ourselves that the road to success in any branch of farming, is any other than earnest, diligent, persistent labor. If there is any one thing more than another that is casting a gloom over agriculture, yea, over every industry, it is the thought that has taken possession of the

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rising generation, that there is no dignity in labor; that it is to be shunned; that by hook or crook, they will get a living without work.

They have an example set before them, by men in high authority, and by lawmakers everywhere. Farmers and laborers should arise unitedly and demand that such examples of profligacy, of utter disregard of honorable service and diligent attention to business, should cease from among us.

I come now to consider briefly, how can success crown this as an industry? There can be but one answer — organized effort. It is only by this means that we can make our influence felt. It is only by this means that those who are advanced in the science of agriculture, can lead up those below them to a higher plane of thought and practice. The Order of Patrons of Husbandry, is doing a noble work in this direction. It is lifting the farmer to a higher plane of thought and labor. It is the first organization that has taken woman by the hand, and bid her come up and aid in making the labors of this life cheerful.

If we would build up the waste places, if we would stay the tide that is constantly setting towards the city, that is draining our rural towns, abandoning the old homestead, we must build up the Grange, and make it a still better educator, for the upbuilding of social and material prosperity of our farming communities. Thus will the church and the school be retained, and these little fountains, the farm homes, remain as they have ever been, the purifiers and upbuilders of our civilization.

The meeting was then adjourned until two o'clock P. M.

Afternoon Session.

The afternoon session was opened with a song "The Farmer Feeds Us All," by Mrs. G. A. Wason, of Nashua, and Miss Colburn, of New Boston.

The President: Ladies and gentlemen, we have with us this afternoon a distinguished gentleman from Massachu-

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setts, a gentleman who was one of the originators of the Agricultural college at Amherst, and was president of it for several years. He will speak to us upon the subject of the fertility of the soils. I now have the pleasure to introduce to you Professor Stockbridge.

FERTILITY OF THE SOILS.

BY PROF. LEVI STOCKBRIDGE, OF AMHERST, MASS.

Mr. President, Ladies and Gentlemen:

I feel compelled to ask your indulgence this afternoon, for you will find at this moment that I am extremely hoarse. I got that hoarseness in an agricultural occupation. When I come to speak for a few moments, I may be so hoarse that you can scarcely hear me, or that hoarseness may pass away, and my voice be perfectly clear.

The human physician, when summoned to a patient, finds his first duty to be to diagnose the disease; next, to learn as far as possible the history of that disease; and then, as far as possible to learn its cause. If he is a man who understands his business, he will study the natural, original constitution and vigor of his patient, and then he will learn, if possible, the present recuperative power of his subject. After that, he will endeavor to remove the cause of the disease, and finally, he will try to find some remedy which will simply help nature in restoring to perfect health. Now, Mr. Chairman, it seems to me that the man who has to deal with the soil can do no better than to follow the course which would be taken by this human physician. Why, sir, we have all heard over and over again that the soil is sick. We have heard it to-day here in this assembly. We have heard that our soils are sick; that they have lost their natural constitution and vigor in order to produce plants, and we have heard it said that this loss of constitutional vigor has lessened the quality and quantity of our plants. And we know it has done so. We know that it has done so to such an extent that after paying the interest on the capital invested in the land,

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and after paying the cost of cultivation and the taxes, the farmer has nothing left. He might as well leave such land, as the speakers of the forenoon have told us they are doing.

Now, this disease to the land is one of the very worst forms of disease, because it is a contagious disease. It is an old disease, and during all the long years no one has been able to administer the remedy. Beginning at Jamestown in 1607, in Massachusetts in 1620, and in New Hampshire in 1623, this disease has spread on and on and on, until the constitutional vigor of our soil is so destroyed that to-day it will not produce one half the crops that our ancestors got from this soil with the most shiftless cultivation; and with the rude tools and instruments that they used, they produced more and better crops than we do to-day. We have been decreasing in the amount of our crops in this eastern section of the country from what was said to be, on the average, a yield of sixty bushels of corn to the acre, until the best State of the Union east of the Appalachian has come down to the average of twenty-six.

MR. CURTIS: The average in New Hampshire for ten years has been thirty-eight.

PROF. STOCKBRIDGE: Well, New Hampshire must be the banner State in the corn crop. You have come down, all over this land, on potatoes, from about three hundred bushels to ninety-seven. Do you get more than that in New Hampshire? I think I am about right on that. You have come down on what was said to be the natural growth of wheat on this soil, from about thirty-five or thirty-six bushels, until now in the Southern States you can get barely seven or eight bushels, and you cannot get in this blessed State of New Hampshire more than about eighteen.

MR. LYMAN: That is about right.

PROF. STOCKBRIDGE: I guess it is lower than that. You have gone down so that it takes very good land, to-day, to give you twelve bushels to the acre. This disease has gone over the great Appalachian chain of mountains and attacked the eastern water-shed of the Mississippi, and has absolutely

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crossed that great river. You hear complaints of this disease in Iowa, you find it in Nebraska and in the Red River valley.

Now I have referred to what the disease is, and in speaking of it as I have, I have to some extent spoken of its history. Now the all important thing is to find the cause, if possible. Here we have soil and plant; soil primarily and plant secondarily, soil and plant in conjunction. But we have had this falling off. Some one said this forenoon, and I wanted to say Amen to it, but didn't dare to in this audience, that the greatest national question to-day is, how we can retain the fertility of the soil and maintain these crops that give us the command of the markets of the world. Who said that?

MR. CURTIS: I guess it was Brother Connor.

PROF. STOCKBRIDGE: I think it was.

I come here to-day and ask you, what is the cause. There is not a man here, but what has in his own mind an idea of what the cause is, not one. But if we cannot make certain things practical, it is just as bad as though we did not know anything about them. We want to know what we can do and what we can find that will remedy this disease. Originally, as I have said, these soils were strong and vigorous; and simply by a little tickling, crops were produced which paid abundantly. And to-day we see growing on these lands crops of forests, for the forest growth is nothing but a crop, and you had better harvest it when it is ripe.

Most farmers have a feeling that the crops grow from the ground, but they do not stop to think what is taken from the ground by them. The plant is utterly unlike the soil, but yet it grows up out of the ground, and so we want to start with the proposition that plants never feed upon the soil as soil, nor upon fertilizers as fertilizers.

We know what the soil is made up of physically. We know that there is material in it that we call loam, and there is material in it that we know is simply the material of the rocks, ground down to powder more or less fine. That is what the soil is. But you do not find the organic matters that are in the plants in the same form in the soil. What do you

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find? The chemist takes his plants and analyzes them, and tells us that he finds certain things. He finds potash, which is the same acrid, corroding material that you find it to be in the arts. He finds magnesia and soda, he finds sulphuric and phosphoric acids. That is what he finds in the plants, with tissues made up of what is called woody fibre. Now the plant finds those materials in the substance of the soil, and it finds them only after the different materials have been separated from the rock, and made into potash, soda, magnesia, and other substances which are soluble in water. Then the plants, when taking in seemingly only the water, take in these substances which are in solution. Also the plants take substances from the gases of the air, carbonic acid being the principal element.

Now this material thus reduced to plant food is what we want to talk of; that is what we want to understand. This rocky matter and the other elements I have spoken of carry or hold the food material of the plants, and they are eliminated from this rocky element of the soil by certain chemical forces acting in the soil; that process is the process of nature, and no thanks to us up to this point. It is the Lord's work. This work goes on every year, every summer and every winter. I do not care whether or not we are in a land where there is any winter, or in a land where there is only six months of summer, summer or winter nature has provided a way by which this soil is made finer and finer, by which this soil is made more and more solvent, and by which it is reduced to such a condition that the plant rootlets shall absorb it and pass it up the stem of the plant, and thus aid in the production of the plant. Remember that this process has been going on during all time. Remember another thing, that this process of making plant food out of the soil will go on just as long as time lasts. The laws of God and of nature remain the same.

This process was going on in this New England soil of ours year after year, before the Europeans came over to rob it, until the soil was literally surcharged with plant food, abun-

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dantly rich in this plant material. The uncultivated New England soil was a regular storehouse or magazine of plant food, ready to be utilized when a man with a head on his shoulders had come here and begun to cultivate it and produce plants. Well, what did that man do when he did come here? He found that condition of things existing and he simply went to work to make plants out of that plant material. He went to work getting his plants and carrying them away, making no recompense and never thinking of returning anything to the soil, but he simply gathered up this plant material which was in the soil and carried it away. That process has now been going on for about three hundred years, more or less, and is it any wonder that the land is sick, sick of such cultivation and of such men as that? Is it any wonder that it has gone down and down, until it is in the condition described? That is the cause of this condition of things. Here you have two forces operating, and the one is very much superior to the other, not in that they do not both always operate, but the one has a greater force than the other. On most of our soils the power of the plant to gather up plant food is superior to the powers of nature in developing plant food out of the soil. Thus when it is carried away, the period must come when the soil becomes in such a debilitated state or condition that it does not pay for cultivation.

Now, Mr. Chairman, we think we have here the cause of this sickness of the soil. But it is one thing to know the cause and it is a very different thing to remedy it. We have found the cause without any trouble. Now how shall we remove the cause? Stop removing this prepared plant food, which is changed into crops, by sending the crops away from the farm. To the men who feel they are patriotic, to the men who heard these ladies sing here this afternoon, I wish to say that that man is not a true patriot or American who encourages the sending away of these crops to foreign countries. But some of these things have got to leave the farm. That is just where the trouble of removing this cause lies. You all know that there are millions and millions of men in this great

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land of ours whose labor produces no food in the way of direct crops, millions and millions who have to be fed by somebody. The ladies sang this afternoon, that the farmer fed them all. That means the four or five hundred thousand in Boston, the millions in New York and all the great cities of this land The farmers feed them all. They have got to have that food. You cannot stop that, and there will be a rebellion if we do not give them enough, and the rivers of the land are made use of as great sewers to carry away this plant food and elements of fertility into the ocean. The same thing is being done on the Atlantic and the Pacific seaboard. But there is no use of our arguing to-day about that. Thus much we have got to lose. Can we stop any part of the drain from the soils of our farms? If so, how? Now I would rather talk to individual man than to any body of men when speaking of these things; I would rather talk to my friend on my right than to all the people in New Hampshire, for I might be able to give him some good advice that I could not give to all of you.

The first point in stopping this waste is to see that every iota of the waste product of the farm is utilized and returned to the soil from which that product came. This is a wonderful time now for using the waste products in this matter of maintaining the fertility of the farm, and supporting our soil so that it can produce crops. We want to utilize every single part of the crop that comes from the farm, and it should be utilized so as to go back on to the farm and thus help sustain the fertility of the soil. That is all simple, perfectly simple. Apply it, gentlemen, then. I have seen men who talked about the way to save the fertility of the farm, and have gone upon their farms, and seen a stream of water running from the eaves of the barn into the barnyard, and from thence into the brook. That is the way they practiced and applied these principles. But that method will not do. It is necessary to utilize carefully and religiously all the waste products that come from the crops of your farms. If you buy crops see that they go back on to your land. That will apply generally to all the farmers of New Hampshire.

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Right in here comes the question of what you shall sell from your farm. You perhaps can sell one thing and not hurt it much, or you may sell another, and you will absolutely rob the soil of its fertility. My advice would be, if you have a dairy, don't you sell milk. Keep your milk at home. Sell butter. Why? Because your butter is a carbon-hydride, and almost all of it comes out of the air, and so by selling that you take little if anything from your farm. The man in the city owns horses, and to feed them he thinks he must have herd's grass. They will give three or four dollars more for it than for clover hay. But one ton of clover hay is worth at least a ton and a half of herd's grass. If you must sell anything of that kind, keep your clover hay at home.

These things are all in the books, and you can find what you are selling. You want to keep those crops at home which contain the best elements of fertility. Otherwise the elements of fertility will be taken from your soil much faster. Every man must be the judge of what he will sell, but I want to tell you as farmers, that by being judicious in this matter, you can keep back a large part of the fertility of the soil, whereas, if you fail in this, your farms will be more quickly depleted of their fertility.

I have already said that nature works on summer and winter. Year in and year out nature is working on and struggling to make as much as she can of the elements of the soil into plant food. That human physician I spoke of, I said would endeavor to find a remedy that would aid nature. I do not believe in drugging a fellow to death. I believe that the true physician is always in real touch with nature, and he will study to use those things which will systematically aid her, but relies upon nature doing the most of the work. So here on the farm, just call nature to your aid, and you aid nature in increasing the fertility and productiveness of the soil, and you will do a most successful work.

To make this practical at once, let me say right here in this line that the thing for the farmer to do is to till the soil and cultivate it. Lay it down as one of the verses in your

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Bible that diligent cultivation is absolute fertility. That is not exactly the way it reads, but it is near enough for you practically. Diligent cultivation is absolute fertility.

THE PRESIDENT: Perhaps some of them do not read the Bible.

PROF. STOCKBRIDGE: Then take it from me. I will guarantee it is so. Why? Because if you should seclude the air from this soil of ours it would be absolutely barren. There would be no changing of the elements of the soil into plant food going on in it. Just exclude the air utterly from the soil, and it would practically develop no elements of fertility. On the other hand the more freely the air gets into the soil, the more actual plant food is developed. Therefore, when the farmer puts on the plow and the drag, and grinds this soil all to a fine powder — the finer the better — the natural law works, and the result will be the entering into this soil through the pores, of the carbonic acid and ozone of the air, which will make plant food out of this soil when it would not otherwise be made. Everybody knows that it is a good plan to plow your land in the fall. Plow it in such a way as to open it up as far as possible to the action of the frost. Why, there is no power on earth that is more of a power than frost. You cannot confine it. And the action of the frost on the soil absolutely grinds it; and when it is made fine, then these forces of nature I have spoken of will make plant food, and the smaller the particles of soil, the more thoroughly and quickly the work is done and the more plant food will be developed.

Plow in mid-summer. Why? Because by exposing that soil in mid-summer to the action of the air, it will absorb the ozone of the air more thoroughly and promote nitrofaction, and the result will be that this simple summer fallowing, as we used to call it when I was a boy, will develop more plant food.

I will say this, — perhaps it is not true, but it is so near it that it will put some one to thinking, and I know that in a great many cases it is absolutely true, — let that farmer who

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finds it necessary to keep a good team to do his work at certain seasons of the year, while at other seasons it is comparatively idle, at any time from the first of April to the first of November, take that team and plow somewhere on his farm, and he will find that the results will well pay him for the driver, plow, and team. If I had nowhere else to plow, I would set the team at work in the pasture, and then sow grass seed and harrow it in, and would expect to be fully remunerated by the amount of food that it would afterwards produce. Follow that up. It is a practical thing. Follow it up, sometimes in one field and then in another, and I will guarantee that you will find it will pay.

I want to make whatever I say perfectly practical. I do not want it in the air, for I am talking into the ground, and I want to make what I say have some practical results.

There is a good deal said about rotation of crops. I know enough of it to satisfy me that rotation of crops is not the thing for a prosperous farmer who has got a good level head on his shoulders and a little tin in his pocket. It will not avail anything in the end. It may do for a few years while you are getting upon your feet, to first plant a surface feeder and then a deep soil feeder, etc. You can get on a few years in that way, while you are gathering force enough to do something better. So if you are in circumstances that make it necessary, try rotation of crops. Plant a surface feeder one year and a deep soil feeder the next; but mark you, that is only a make-shift for the day, just to keep you going until you can get start enough from some source to work in a more substantial manner.

Now, Mr. Chairman, I am going to hurry on. I can see the end of my thread.

I have already said that you have got to send away some of this plant food. We have got to send cattle to England. You cannot stop it in any way if you try. You have got to send wheat to England. You have got to send millions and millions of tons of absolute plant food away from the home where it grows, away from our God-blessed country, and you

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cannot get rid of it. The farmers this year are carrying the happiest faces I have seen for years from the fact that, from the Atlantic to the Pacific, they have got the heaviest wheat crop that I have ever seen; and they are happy because they hope to get $1.30 a bushel for it. They are happy because they are going to sell these crops away from America, and they are going to make those fellows pay a good price for it. They are going to sell it away from this country. Then what is going to become of this proposition that I started out with? How are we going to keep this at home? I will not take up that question now. It may be profitable to discuss it in some localities. I come to another. The Lord has, in some way or another, contrived to put into our American world the most wonderful reserve forces to make up for the losses caused by man who is carrying away the fertility of the land. We have here at our hands the most wonderful reserve forces which we can apply to, and put back on our land to take the place of what we are constantly taking away. Here I am going to speak of the matter of commercial fertilizers. I may say some things that you will not believe, but I think that whatever I shall say is the truth.

This reserve force we have in the phosphoric rocks in this country. Here we have an inexhaustible supply of these phosphates which we are carrying away from our farms and our country in the bones of our animals which we export to foreign countries. An inexhaustible supply has been provided by nature to make up for that loss. Every year we are finding more and more of it. It was only a few years ago when there was no such supply known. All our phosphates were then made simply from bones. Now, we can go to the phosphoric beds of Charleston, South Carolina, and can get an almost inexhaustible supply of this phosphoric acid, to make up for the loss of the phosphoric acid we send away in our wheat crop. Now, I tell you, and it is God's truth, that phosphoric acid which goes into the wheat crop is precisely the same as that which is obtained in that rocky form and reduced. It is precisely the same thing as it is if you take it out of bones. There is no difference.

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Our crops are also carrying away every year vast quantities of potash. That we cannot get here, but we do get it from abroad. While we are sending wheat to Germany, we are bringing back millions of tons of potash from that country. The country there is full of it, and there seems to be no end to it. I can confidently prophesy that the time is not far distant when we shall find the same deposits here in our own country, but to-day we have to bring it from abroad.

Now comes the nitrogen element. The nitrogen, of which the air is largely composed, is, perhaps, the most costly and valuable of all the elements we need to buy. We get this nitrogen on our own soil in the form of refuse from our gas manufacturers and in other ways. Up to this time there has been no failure in the supply, and there is no doubt but what we can get all the nitrogen we need. I hope that some young man who is going to be educated in the New Hampshire Agricultural college will be the man who will find out how to gather it from the air. I honestly believe it is going to come. Why, in this air there is nitrogen enough to supply the growing crops of all the land. We have enough here to produce all the crops that will ever be grown upon this American continent, if we can find the man who will teach us to extract the nitrogen element from the air.

I have only spoken of three elements. In plants we have four organic elements and eight or nine inorganic elements; but practically for the work on the farm all we need to talk about are the three inorganic elements. There are only three inorganic elements that we have to restore. We are all agreed; scientific men are all agreed; and practical men know, that if you take potash, phosphoric acid or superphosphate, and nitrogen, you can make practically a perfect fertilizer. On the average soil of New England, if you take these three elements, nitrogen of the organic, and potash and phosphoric acid of the inorganic world, you have got a fertilizer which will take the place of farmyard manure and all the refuse of the farm, and will enable you to grow crops. It is not my object, nor have I the time to show you my reasons for saying

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this, further than I have done; but I pledge you that any New Hampshire farmer who will take nitrogen, potash, and phosphoric acid — which should be solvent so that the water will take it up, and the plants will gather it from the water — can take the poorest farm in the State of New Hampshire to-day, where there is water enough to carry on the process of dissolving this fertilizer and giving it to the plants, and he need not use any other element whatever; he can make that farm fertile, and can do it and get pay for his labor at the same time. That is a strong statement, but I have proved it.

Another thing — organic matter is absolutely essential in every soil, but we have put on inorganic matter in this compound I have spoken of. But when you put these plants into the soil, and make them grow in the soil, it will fill the soil with roots. Then you will make clover grow on that soil, and when a man has got a good crop of clover, he knows that he has got over a dangerous bridge.

A Voice: The trouble is that it winter kills.

Prof. Stockbridge: Sow it in the spring and plow it in the same year. Plow in the second crop, and you will give to that soil the organic matter necessary to give it a retaining and absorbing power.

I could enlarge upon these things a good deal further, but you see I am getting hoarse. I will try to speak a few moments longer.

In all these matters that I have been speaking of, the question of economy comes in. You can buy a fiddle, and pay too much for it. You have got to grow these crops in such a way that you will get pay for your labor. The question of economy must come in everywhere, and so it must enter into the question of the use of these fertilizers which I have spoken of — potash, soda, nitrogen, and phosphoric acid. Supposing you have got potash enough in the soil, do you want to buy any more to put on? Supposing you have phosphoric acid enough, supposing you have nitrogen enough, do you want to pay eighteen cents a pound for nitrogen when you have ot enough? No, you do not. Any body knows you do

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not. But are you wise enough to tell me whether you have got enough of any one of these elements or not? Can you tell me you have got potash enough in your soil, and do not need to apply it? Can you tell me that you have got phosphoric acid enough — I mean in the elements which will be developed into plant food? Can you tell me you have got nitrogen enough? If you can, and know it, you are all right and can save your money. Now, every man should be sufficiently intelligent, to-day, to know so much of the condition of his soil. He should know it by absolute observation and experiment in trying his crops. He should know enough of his own acres to be able to determine that. By that means he can save dollars and dollars.

QUESTION: How is he to know this? By the development of the plants he raises?

PROF. STOCKBRIDGE: Here is the trouble with that method. You put in a fertilizer made this year without any potash and produce a perfect crop. You are perfectly satisfied with your crop and you say that your soil has potash enough. Now perhaps that year you have drawn off all the potash that you had in the soil, and if you go on the principle that you have enough potash in your soil the next year, the crop may be a failure, although you may have put on your phosphoric acid and nitrogen, it being the rule that the quantity of the minimum element in the soil will measure the maximum crop. Now a man of your intelligence will not need my personal advice upon that subject. I know you can, as a Yankee, guess pretty near what to do. But if I am to speak to the farmers of all the State of New Hampshire upon this subject, I would say that in these fertilizers we have an abundance of material to keep up the plant food on our farms, and I can tell you of no other way than to use nitrogen, potash, and phosphoric acid. Some men may know how to do it economically, but the most of the men of New Hampshire cannot know which of these elements is the most needed, and the only way I see is for him to use them all.

I beg your pardon for stopping here, but I will be very

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much obliged to you if you will excuse me. I could talk for an hour longer upon this subject, if I were not so hoarse.

THE PRESIDENT: We have a gentleman with us to-day that you have heard speak before upon this subject, doubtless. I have the pleasure of introducing to you Professor Whitcher of Hanover.

REMARKS BY PROF. G. H. WHITCHER.

Mr. Chairman, Ladies and Gentlemen:

I do not propose to speak very long. I remember very well the first time I ever listened to a lecture on the subject of plant food. It was at Concord in the representatives' hall in the state house. The lecture was given by Professor Levi Stockbridge, the gentleman who has spoken to you this afternoon. We will call it that he is not here now. I will say that it was the best speech I ever heard in that hall excepting the great railroad arguments of a session or two ago. He spoke there upon the subject of plant food, in 1877 or 1878. It was the first time I ever heard that subject touched upon. It called to my mind, as I believe it did to the minds of everybody present, the fact that there was such a thing as plant food. I had heard very little about it at that time. The name of Professor Stockbridge was not connected with plant food and the subject of rations as it has been since. This was all practically new at that time. Now the good seed fell from his lips and I presume that it fell upon stony ground in many cases and it was choked out by weeds in many other cases. But the seed that was planted there by that lecture, and subsequently top-dressed by the labors of Professor Sanborn at the New Hampshire Agriculture college and the work done by other men connected with various colleges, has given us a desire to doctor the sick soil. The medicines that are used in doctoring the sick soil are very much better than many of those used to doctor the human body. Ayer's Hair Vigor may be a very good thing to color grey hair black, and Beecham's pills are all right if anybody wants them. But all of those things are

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trash, a good many of them are nothing but cheap whiskey. But when you come down to the subject of doctoring the sick soil the medicine has been prepared on a scientific basis, and I do not know of any man in the United States that has been more instrumental in giving us a rational formula than Professor Stockbridge. I know very well the basis that he is working on, and you all know it very well.

There is one thing that has come to my mind here to-day, and I wish to bring out that one point. While Professor Stockbridge was speaking, the parable of the sower came to my mind, and I thought that that parable might be well applied here. Professor Stockbridge by his lectures and by this lecture to-day has scattered over the State this seed, which has got to produce fruit, but the yield depends entirely upon the ground on which it falls. Some of the seed in the parable, you know, did not yield very well. If you go home from this meeting to-day and do not think any more of this subject, you will be the stony ground and you will lose the profits of this talk. If on the other hand you go home and consider the subject carefully and apply the principles to practice, then you will see that fruit will come of it.

Mr. Connor asked the question how he was going to know what his soil lacked in order to raise good crops. The only way to know is to find out by actual experiment on your own soil and under your own conditions of croping, whether you want nitrogen, phosphoric acid, or potash, or all three or two of them, or what not.

There are one or two things that I wish to caution you about. It is always customary to criticise a speaker more or less. Professor Stockbridge said that if you have teams that are not otherwise employed, plow your pastures. That is all right to do with some pastures, but the professor has not tried, nor experienced the agony of plowing some of our New Hampshire pastures. It would be a risky job to attempt.

He says that he wants some of the graduates of the New Hampshire Agricultural college to find out how to get this free nitrogen out of the air. I do not think that would do.

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In the first place I think it would be a very risky thing, for if a way should be found in which it could be got in the form of a commodity you might soon find that there was a tax placed on, or a trust formed to control, this free air that God has given us.

Just one thing more and I am done. Think very carefully about what the professor has said in regard to the rational system of doctoring your soil. I do not doubt but that there are some here who have got sick soil. Some of it is very sick, some is just beginning to be sick, and some has been sick and is getting better. That is the kind we want to see. We want more of it in that condition. There is a rational way of doctoring this soil and you have got to do it in that way or give up farming in New Hampshire. You cannot sit down and say: My great grandfather produced good crops without any particular system and why cannot I. The time is past for doing that. These times we must put into practice these scientific methods that we have heard about. Next year put into practice what the professor has said to you to-day. See what your soil needs and apply that. He spoke of the economical side of this fertilizing question. It will not pay you to doctor your soil five dollars' worth and get one dollar and fifty cents in return. You want to doctor it one dollar and fifty cents and get five dollars in return. Can you do it? It depends entirely upon the man. There is no professor that you can find on earth, who can tell you how to make money farming. There are certain principles of chemistry relating to this subject of plant growth that a chemist can tell you about, but just how you shall treat your soil and just what you shall grow must be decided by yourselves.

QUESTION: And you have to depend upon the market?

PROF. WHITCHER: Yes sir. We can tell you something about what your plants need. Professor Stockbridge has given you suggestions about how to doctor your soil. But you have got to determine what will pay, whether it is better to raise onions or cabbages. We cannot tell you what crop is best. We cannot tell you whether a ton of Strockbridge fertilizers

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or of Bradley's manures, in your condition of soil will give you back more than what you pay for them or not.

This, Mr. President, is all I have to say here to-day.

THE PRESIDENT: Ladies and gentlemen, I now have the pleasure of introducing to you Mrs. Alonzo Towle, of Freedom, who will speak to you on this occasion. It gives me great pleasure to have a lady speak to us at this time.

REMARKS OF MRS. ALONZO TOWLE OF FREEDOM.

Mr. President, Members of the Board of Agriculture, Sisters and Brethren:

It no doubt seems very strange to you this afternoon to have a lady introduced to you under the auspices of the Board of Agriculture. You will say to yourselves, this is a new departure. But why not? Are men alone interested in agriculture? Does it depend only upon our husbands, brothers, and fathers that we are successful as a farming community? If not, then why not? I have often thought when hearing of the good results of your farmers' institutes, and how many of your evening sessions were well attended by the ladies, how much they must be interested in their own business and that of their husbands that they should attend these meetings when you give so little attention to their work, and in but very few instances is occasion given us to say anything for ourselves.

The subject that I would like to talk about especially is woman's work, and the education of our farmers' girls. If I understand the matter rightly, what you grangers are in quest of is to establish a class of men who will be successful tillers of the soil. In your judgment you have taken the initial, the first step, when you take them at as early an age as practical and educate them in the line of agriculture. This is well, but have you gone far enough? Have you in your thought seen a power underlying all other powers, a factor that must be recognized in the sum total of their young lives, a secret agent which explains many unexplainable facts of

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the past? Who have furnished our large towns and cities with their most successful business and professional men? Who have furnished nearly all places with health of body, sterling qualities of mind, and sound judgment? Surely, only the farmers' wives. What has created this restlessness that has been so prevalent among our young people within the past twenty-five years? What has filled them with this heart-rending ambition and discontent, that has caused them to seek here, there, and everywhere for something, they know not what? I answer you by saying it was transmitted from the mother blood. Our grandmothers and great-grandmothers who settled upon our farms were women who were contented with their lives. They had no other ambition than to do their work as well as they could and raise large families of children. They knew nothing of the world, and cared less. They had no other lives to compare their own lives with. Therefore they were contented because they were far removed from the centres of civilization. They lived their lives of integrity and died in peace. Then came another generation. By electricity and steam we are brought close to the cities. Women began to see other lives, began to see that there was a city culture, that there was a difference between their lives and those of their city sisters. They grew discontented. While they recognized their own innate qualifications, and those of others around them, they knew that they had lacked opportunities. These women of the country are strong, independent women. They were discontented, but they would not deign to acknowledge it. This repressed life has stamped itself upon the generation following, and now, while you see them struggling here and there for an education and taking every means to perfect it, you see this restlessness. It is there and you cannot blot it out. How can women who are sick and tired of farm life, weary and disgusted with its drudgery, give prenatal nourishment and vitality to a race of men who will love rural life and its conditions? Is it possible?

You want a class of men who will look with intense satis-

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faction upon our broad, green fields, our dark, deep forests, and great streams. Can you do it by education? You may in a measure. To do this thoroughly, you must begin with the mothers. Take the girl of to-day. She comes to her wedding-day with little or no idea of her responsibilities as mother or wife. She thinks she has knowledge enough to pilot her through the first years of housekeeping, because housekeeping for two is not a great deal. She soon finds there are cares and emergencies not thought of before. She finds that she is totally unable to meet them. She often wonders if she is quite herself at all times, as the closeness of domestic life has brought out so many traits not recognized before. Then, too, her hand is not as deft as when the good mother was at her side to teach her out of her many years of hard bought experience. And with the mother there was never any methodical training. It has always been a running of risk for results in this the most important part of women's work. What has been the result of this hazard work? Some by dint of courage and perseverance come out triumphant as our best housekeepers. But ask those women to-day how it would have been, if they had begun their lives where they found themselves at the end of ten years, and they will tell you that ten years more of happiness would have been added to their lives. Another class become discouraged. The family breaks. One drifts here, the other there. The last, though not by any means the least in numbers, go on day after day making the same mistakes, the same to-day as yesterday, to-morrow as to-day. The little children begin to fill the vacant places at the table. We see their little blue, dyspeptic faces, and they tell us how an evil thing is silently but surely at work undermining their health, and cheating them out of all their future. It is then that the mother looks back into the past with sorrow, and forward into the future with fear. Sisters, it has long been recognized that woman's influence was a telling power in all intellectual and moral life. Is it more so than when she stands at the moulding board, and is dealing out to those she loves best either those

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things that will nourish, sustain, and make them better, or something that will poison their blood and ruin them forever? Alas! how many hearts have been broken, and ties severed because this king of physical being — the stomach — has rebelled. How many men have been sent to their cups and drunkards' graves; how much of sin and sorrow and of misery! Many women are seeking for a mission. Here is a field so broad that it covers the whole earth, and so high that it reaches up to the stars.

What shall we do then? Educate them. Develop them intellectually and morally, and also teach them scientifically in their own line of work. Open the doors of your academies, seminaries, and schools of learning.

Provide in your schools opportunities whereby she may learn domestic economy and the culinary art. Give them a beautiful symmetrical education, which is the education of the woman, and prepares her for happiness and for the home.

Now, brothers, do not say that because you are farmers, your girls only need the most meager education. If there is a class of women on the face of this broad earth that deserve to have every avenue of happiness opened to them, it is the farmers' wives. They richly deserve it, and it will be well for you to look to it and see that they have it.

I saw in a paper the other day an article where one woman in referring to the housewifery art, calls it a lower order of work. That is one thing that tells against it. There is a class of women, they mean well perhaps, but they have not looked at both sides of the question, they ever say "a lower order of work" when they speak of the culinary art. Yet it takes just as much skill to prepare a meal scientifically and lay a perfectly appointed table, as it does to execute the finest piece of classical music. It requires as much ethical knowledge to raise a family of boys and girls and bring them up successfully to manhood and womanhood, as to write the finest modern essay. And, my good sisters, it takes as much of the grace of God for us to live at peace with our husbands, our children, and our neighbors, as for the minister of God to live in peace with his wife, children, and neighbors.

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All professions, nearly all business and trades are open to women and a great many are taking advantage of that. I find no fault with them. I bid them God-speed. If the Great Father has given to any woman a special gift, it is her duty to improve upon that gift. But while they are so well provided for they must allow us the same privilege.

What have you done for the large class of women who are our home-makers and housekeepers? Yes, what? I ask you to-day for them. Just a little way from this, almost in the geographical centre of your State, you will soon have a beautiful college. It is yours. It does not belong to any one else; it is all yours. It was given to you. And now you will have everything you wish. Money is a great power in these things, and financially you are independent. I ask you, brothers, that you will see to it, that that college is furnished with just what I have asked you for. And I ask you, mothers and farmers' wives, that you will see to it that your girls are sent there.

A few words to those sisters who are in middle life, you who have come up to the thirties, the mothers who are just going out of the forties, your hands must be extended to the older ones to steady their steps as they go down toward the grave, your help must also be given to those coming after you, and thus in all your works you must labor, reaching out with the right hand and the left. God bless your efforts.

To those who have gone on before, who have passed the working part of life, all we ask of you is to shine, shine. Shine by your kind words and friendly acts, shine in the sweetness and goodness of your age, for soon we shall pass to that time when we shall have no future, when we shall have only the past. Then, if we have not filled our past with good deeds, we shall have no pleasant memories.

Brothers, remember that "amid all that is bright and beautiful in nature, there is nothing which blooms with such unfading colors; there is no perfume on earth so fraught with fragrance, as the flowers of good works and the sweet smelling savor of that pity which feels for the wants and relieves the distresses of our brothers and sisters."

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THE PRESIDENT: We have present with us the Secretary of the Board of Agriculture of New Jersey. We will close our meeting by listening to a few remarks from him, Mr. Franklin Dye of New Jersey.

REMARKS BY HON. FRANKLIN DYE,

SECRETARY STATE BOARD OF AGRICULTURE OF NEW JERSEY.

Mr. President:

It would be a great pleasure to me to talk to this audience for an hour or more and emphasize many points that have been brought to your notice to-day. But the time is short, you are tired, and it would be an imposition to do so.

I heard of this meeting accidentally, and either accidentally or providentially, I am here. I wanted a little rest, and I thought I would take it and at the same time look at the New Hampshire people.

Let me call your attention to what you already know, the importance of the farmers' calling, the farmers' business. You know how, in the past few weeks, the whole world has been looking with the most interest at the products of the farms of this country. The business world has been at a stand still waiting for the possible results of the farmers' hard work and the farmers' wives' hard work, for I speak of the farmers' wives, as I go about my own State. All this indicates the importance of your work.

It was my privilege two or three years ago to go before that august body, the Ways and Means committee of Congress. I said to them that for twenty-five or thirty years, the manufacturing interests had their committees at Washington, they had stayed there, they had labored there, and their demands were heard and they were granted what they asked. But it was otherwise with the farmers. The farmers had no committees there, they had not asked for much and consequently they had been neglected and the importance of the farming community had not been brought to the attention of Congress. I mentioned two or three reasons why their wants should be con-

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sidered. One was because the farmers were the greatest taxpayers of the nation; also, they are interest payers, have been so to too great an extent, as you all know. Another point that I laid before that committee was that if the statesmen neglected the farmers' interest, they must soon expect the country itself, as a republic, to go down. Farmers must have an interest in their country, and that interest can be augmented by enabling them to own their homes. I said to them we must depend upon the children of our farmers to uphold these grand institutions. And these things are so. The more prosperous the farmers, the more prosperous is the country.

Our sister spoke a few moments ago about the hard lives of the mother and daughter upon the farm. Since their eyes have been opened, it is not pleasant. To remedy this, we want to make the farmers' homes the most attractive homes on earth. Dear friends, let me emphasize this thought and let me talk to you as I talk to the wives and mothers of our own State. You are struggling to help your husbands make the farming pay, but do not forget the most important crop of all, the farmer's child. Is it not something to be the mothers of statesmen, ministers, and of all good citizens. And if it is true, and it is, that the prosperity of our God-given institutions does depend upon the farmers, then, mothers and fathers, give close attention to the cultivation of this most valuable crop. Do not let it be said of you as a young lady said to her father, in my own State, I am sorry to say: "Father, you think more of your hogs than of your daughter." A gentleman in speaking of the fashions of Boston says that it is the fashion there for the mother to send the nurse with her pretty child and the baby carriage into the park, while she goes out with a pet dog. Is it love when a mother is ashamed to take her own offspring and care for it and would rather ride out with a poodle dog than with her own child? Let us attend to this matter. I say to you in New England: Take care of this most important crop.

We look forward to the time, and hope it will come, when there will be no abandoned farms in your New England. We

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have reached a state of cultivation of the land, never before reached, and by these means, I think it will soon come.

God bless the farmers; they are the bone and sinew of the land and hope of the nation.

SPECIAL MEETING AT CONCORD.

A special meeting of the State Board of Agriculture was held at the office of the Board, State House, Concord, Wednesday, Dec. 31, 1890, for hearing the report of the committee of Investigation in regard to the Thompson will and for taking action thereon.

Present, President Humphrey, Vice-President Philbrick, Messrs. Thompson, Lyman, Towle, McDaniel, Perry, Wason, Covell, and the secretary.

The Thompson will was read by the secretary, after which the following report was made by Alonzo Towle, chairman of the committee appointed at the annual meeting:

REPORT OF COMMITTEE OF INVESTIGATION ON THE PROVISIONS OF THE THOMPSON WILL.

Mr. President and Members of the State Board of Agriculture:

Your committee have attended to their duties and submit the following report:

We have made investigation of the records, in the office of Register of Probate for Strafford county, of the will of Benjamin Thompson, late of Durham, and find the property invested as follows: The figures being the market value of same as determined by the appraisers.

Real estate	$18,300.00
Bonds	60,795.00
Bank stock	40,093.00
Railroad stock	249,048.00
Manufacturing stock	9,291.00
Land stock	125.00
Deposit Strafford National Bank	14,172.74
Deposit Strafford County Savings Bank	15,948.47

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Cash	$215.00
Household furniture	232.50
Farming tools	
	$408,220.71

By provisions of said will no interest is required to be guaranteed upon the real estate valued at $18,300.

This deducted from the total value of the property leaves $389,920.71 on which the State is required to guarantee a net annual compound interest of 4 per cent, which for the present year would be $15,596.83.

In addition to this amount the State is required to appropriate $3,000 annually, making a total for the present year of $18,596.83. It has been ascertained from good authority that the present annual income of the property as now invested is about $19,500.

Deducting from this amount $15,596.83 which the State is required to guarantee at 4 per cent interest and $3,000 to be appropriated, leaves a balance of $903.17 that the State will realize after complying with the provisions of the will.

Your committee have ascertained that in the opinion of the executors, fortified by that of competent financial experts, the future income of the invested funds will not be less than, and may considerably exceed the amount of the present income; from all which it would appear that the net annual income from the invested funds and cash on hand will be more than sufficient to cancel the four per cent interest upon the property devised, required to be paid by the State, and also the three thousand dollars per annum and interest thereon required to be furnished by the State for the period of twenty years, according to the provisions of the will.

In view of these facts in addition to the educational advantages to be derived, your committee respectfully recommend that the State accept the provisions of the will of said Benjamin Thompson, late of Durham.

ALONZO TOWLE, M. D.,
CHAS. McDANIEL,
N. J. BACHELDER,
Committee.

A discussion followed the reading of the report, participated in by all members present.

Voted, That the report of the committee be adopted.

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Voted, That the president of the Board appoint a committee of three to draft a bill to be introduced in the Legislature, accepting the provisions of the Thompson will. The president appointed Messrs. Towle, McDaniel, and Secretary Bachelder as the committee.

No further business appearing the Board adjourned.

N. J. BACHELDER,
Secretary.

ANNUAL MEETING AT HAMPTON.

The Board met in annual session at Boar's Head, Hampton beach, Wednesday, August 26, being the last Wednesday in August, at 7.30 o'clock P. M. and was called to order by President Moses Humphrey. The members present were Philbrick, McDaniel, Perry, Thompson, Towle, Lyman, Wason, and Secretary Bachelder.

The records of the previous meeting having been printed, the reading was dispensed with.

Voted, To hold the annual winter meeting at Newport in Sullivan county, January 13 and 14, 1892 and the president, secretary, and county member were constituted a committee to arrange the programme.

Voted, That the time and place of holding the several county institutes be referred to the secretary and member from the respective counties.

Voted, That the by-laws be so amended that the annual meeting shall be held at the office of the Board in Concord on the third Wednesday in August.

Voted, That the next annual field meeting be held at Boar's Head, Hampton, on the day following the third Wednesday in August, 1892.

Voted, That the arrangement of the programme for the annual field meeting be referred to the president and secretary.

No further business appearing the Board adjourned.

N. J. BACHELDER,
Secretary.

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APPENDIX.

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APPENDIX.

LAWS OF JANUARY SESSION, 1891.

[From Pamphlet Laws.]

CHAPTER 12.

AN ACT TO ACCEPT THE PROVISIONS OF THE THOMPSON WILL, AND TO PROVIDE FOR THE PRESENT DISPOSITION OF THE FUNDS.

Whereas, Benjamin Thompson, late of Durham, in this state, died January 30, 1890, leaving a will and codicils thereto, which have been proved, approved, and allowed by the probate court of the county of Strafford, by which he devised a large share of his property to the state of New Hampshire, in trust, for the establishment and maintenance of a school or college, to be located on his "Warner farm," in said Durham, wherein there shall be thoroughly taught, both in the schoolroom and in the field, the theory and practice of agriculture, and other sciences connected therewith, and wherein there may be taught such other arts and sciences as may be necessary to enable the state to fully avail itself of the donation of land made by the act of the congress of the United States approved July 2, 1862, entitled "An act donating land to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts;" and,

Whereas, Said bequest is made subject to certain provisos, conditions, and limitations set forth in the will and the

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codicils thereto, to which reference is made for the particulars thereof; and,

WHEREAS, By one of said conditions it is provided that said bequest shall become null and void if the state does not accept the trust within two years from the time of the decease of said Thompson; now, therefore,

Be it enacted by the Senate and House of Representatives in General Court convened:

SECTION 1. That the state of New Hampshire does hereby gratefully accept said bequest, subject to the provisos, conditions, and limitations set forth in said will, as modified by the codicils thereto, and, in consideration thereof, does hereby promise to execute said trust in accordance with the terms of said will.

SECT. 2. The state, in compliance with the requirements of said will and codicils, promises and guarantees to appropriate, and does hereby appropriate annually, for the term of twenty years from and after said Thompson's death, such sum as will pay a net annual compound interest of four per cent per annum upon the amount of the appraised value of the estate bequeathed and devised to the state as aforesaid, aside from the real estate situated in said Durham, after deducting therefrom the legacies given by the codicils to said will, and does hereby authorize and direct the state treasurer to credit said sums to the trust fund, as provided in the fourth section of this chapter.

SECT. 3. The state, in further compliance with the requirements of said will and codicils, promises and guarantees to appropriate, and does hereby appropriate annually for the term of twenty years from and after said Thompson's death, the sum of three thousand dollars, and such further sum as will pay a net annual compound interest of four per cent per annum upon said annual appropriations from the dates when they severally become a part of the trust fund until the expiration of said term of twenty years, and does hereby authorize and direct the state treasurer to credit said sums to the trust fund, as provided in the following section.

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SECT. 4. The state treasurer, upon receipt of the estate devised to it by said will and codicils, shall open two accounts in a book provided for the purpose, as follows: He shall open one account with "The Benjamin Thompson Trust Fund," and shall credit therein to said fund, under date of January 30, 1891, the amount of the appraised value of the estate received by the state by virtue of said Thompson's will, together with a sum equal to four per cent upon said appraised value (not including the real estate situated in said Durham), and on the thirtieth day of January in each year thereafter until and including January, 1910, excepting when such day falls on Sunday, and in such cases on the day preceding, he shall credit to said account a sum equal to four per cent upon the total amount of said trust fund, excepting the appraised value of the real estate in said Durham, after the credits of the preceding year have been made. He shall open the other account with "The Benjamin Thompson State Trust Fund," and shall credit therein to said fund, under date of January 30, 1891, the sum of three thousand dollars, together with a sum equal to four per cent upon said sum of three thousand dollars, and on the thirtieth day of January in each year thereafter, until and including January, 1910, excepting when such day falls on Sunday, and in such cases on the day preceding, he shall credit to said account a sum equal to four per cent upon the total amount of said trust fund after the credits of the preceding year have been made.

SECT. 5. The accounts so made shall represent the amount of the trust funds in the possession of the state; and the state guarantees to preserve them intact and unimpaired until they shall become available for opening and maintaining said school or college, and then to administer them as required by said will.

SECT. 6. The state treasurer is hereby authorized to receive from the executors of said will the money, notes, bonds, stocks, and evidences of debt coming to the state by virtue of the will, and to give proper discharges therefor in the name of the state.

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SECT. 7. If any notes, bonds, stocks, or evidences of debt shall come to the state treasurer from said executors as a part of said estate, he may, with the approval of the governor and council, convert the same into money, — selling the stocks and bonds by auction at the Boston Stock Exchange, or such other place in Boston as property of that kind is usually sold.

SECT. 8. All notes, bonds, stocks, and other evidences of debt coming into the possession of the treasurer and not converted into money as aforesaid shall be transferred to the state and be carefully preserved by the treasurer. The governor and council may authorize any person to vote upon any of such stocks at meetings of stockholders of the corporations to which the stocks appertain, and may authorize a sale and transfer thereof whenever they deem it to be for the interest of the state.

SECT. 9. The governor and council are authorized to sell and convey any real estate coming to the state by virtue of the said will, which the state has power to sell, in such manner and at such time as they shall think for the interest of the state, and may make and execute in the name of the state proper conveyances thereof, upon payment of the consideration therefor to the state treasurer.

SECT. 10. All money received from the sources aforesaid shall be used as soon as practicable after its receipt in paying and retiring outstanding indebtedness of the state; and the state treasurer shall keep an itemized and true account of all money and securities of any kind so received and of the disposition made of the same and of the proceeds thereof, and shall give a full account thereof in his annual reports and shall state in each annual report the exact condition of said funds.

SECT. 11. The board of agriculture is hereby authorized and directed in behalf of the state to receive possession of the real estate in Durham coming to the state by virtue of said will, and to care for, control, and manage it until it is needed for the uses of the school or college to be established as provided in the will.

SECT. 12. The board shall make report of their doings in respect to such real estate in their annual reports.

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SECT. 13. In case the state shall desire to establish said school or college at any time before the expiration of twenty years from the time of the decease of the said Thompson, it shall, before using any of either of the funds aforesaid, raise and set apart such sums of money as will make said funds equal in amount to what said funds would become if accumulated during twenty years; and having thus raised and set apart such sums of money, the state shall thereafter be relieved from the obligation of appropriating annually for the balance of the said term of twenty years the said sum of three thousand dollars, and guaranteeing the net annual compound interest of four per cent thereon; and the state shall also be thereafter relieved from the obligation to provide for or guarantee any interest upon the amount of the appraised value of said estate, as hereinbefore provided.

SECT. 14. The governor and council are authorized in behalf of the state, to make and enter into such further stipulations with the executors of said will and to give such further guarantees as the executors shall require to secure the objects intended by said Thompson to be secured by his will and codicils, and to affix the name and seal of the state thereto, and to do all other acts that may become necessary to secure the rights of the state under said will.

SECT. 15. The said will and codicils shall be recorded in the office of the secretary of the state.

SECT. 16. This act shall take effect and be in force from and after its passage.

CHAPTER 40.

AN ACT TO CONSTITUTE A STATE BOARD OF CATTLE COMMISSIONERS.

Be it enacted by the Senate and House of Representatives in General Court Convened:

SECTION 1. That for the purpose of facilitating and encouraging the live stock interests of the state of New Hampshire,

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and for extirpating all infectious and contagious diseases, especially tuberculosis, that now are or may be among cattle, a state board of cattle commissioners is hereby created, to consist of the secretary of the state board of agriculture, the master of the state grange, and the secretary of the state board of health, who shall be charged with the execution of the provisions of this act, whose powers and duties shall be those provided for in this act, and whose compensation shall be fixed by the governor and council. Any vacancies occurring in the board from any cause shall be filled by appointment by the governor and council. The said commission shall respectively take an oath faithfully to perform the duties of their office, and shall immediately organize as such commission by the election of one of their number as president thereof, and proceed forthwith to the discharge of the duties devolved upon them by the provisions of this act.

SECT. 2. That it shall be the duty of the said commissioners to cause investigation to be made as to the existence of tuberculosis, pleuro-pneumonia, foot and mouth disease, and any other infectious or contagious diseases among cattle, and such commissioners, or their duly constituted agent, are hereby authorized to enter any premises or places, including stock yard, cars, and vessels within any country or part of the state in or at which they have reason to believe there exists any such disease, and to make search, investigation, and inquiry in regard to the existence of said disease therein. Upon the discovery of the existence of any of the said diseases, the said commissioners are hereby authorized to give notice, by publication, of the existence of such disease and the locality thereof, in such newspapers as they may select, and to notify in writing the officials or agents of any railroad, steamboat, or other transportation company doing business in or through such infected locality, of the existence of such disease; and are hereby authorized and required to establish and maintain such quarantine of animals, places, premises, or localities as they may deem necessary to prevent the spread of any such disease, and also to cause a disinterested appraisal of the animal or

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animals affected with the said disease, in accordance with such rules and regulations by them as hereinafter authorized and provided, and also to cause the said animals to be destroyed, and to pay the owner or owners thereof one half of their value, as determined upon the basis of health before infection, out of any moneys in the treasury not otherwise appropriated: provided, however, that no appraised value shall be more than one hundred dollars for an animal killed; and provided, further, that in no case shall compensation be allowed for an animal destroyed under the provisions of this act, which may have contracted or been exposed to such disease in a foreign country, or on the high seas, or that may have been brought into this state within one year previous to such animal showing evidence of such disease; nor shall compensation be allowed to any owner who in person, or by agent, knowingly and willfully conceals the existence of such disease, or the fact of exposure thereto, in animals of which the person making such concealment, by himself or agent, is in whole or in part owner.

SECT. 3. That the said commissioners are hereby authorized and required to make, record, and publish rules and regulations providing for and regulating the agencies, methods, and manner of conducting the investigations aforesaid, regarding the existence of said contagious diseases; for ascertaining, entering, and searching places where such diseased animals are supposed to exist; for ascertaining what animals are so diseased; or have been exposed to contagious diseases; for making, reporting, and recording descriptions of the said animals so diseased, exposed, or destroyed, and for appraising the same, and for making payment therefor; and to make all other needful rules and regulations which may, in the judgment of the commissioners, be deemed requisite to the full and due execution of the provisions of this act. All such rules and regulations, before they shall become operative, shall be approved by the governor and thereafter published in such manner as may be provided for in such regulations; and after such publication said rules and regulations shall have the

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force and effect of law, so far as the same are not inconsistent with this act and other laws of the state or the United States.

SECT. 4. That any person or persons who shall knowingly and willfully refuse permission to said commissioners, or any one of them, or their duly constituted agent, to make, or who knowingly, and willfully obstructs said commissioners, or any one of them, or their duly constituted agent, in making all necessary examinations of, and as to animals supposed by said commissioners to be diseased as aforesaid, or in killing the same, or who knowingly attempts to prevent said commissioners, or any one of them, or their duly constituted agent, from entering upon the premises and other places hereinbefore specified where any of said diseases are by said commissioners supposed to exist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, or of any of the acts in this section prohibited, shall be punished by fine not exceeding one hundred dollars, or by imprisonment not exceeding ninety days, or by both fine and imprisonment, at the discretion of the court.

SECT. 5. That any person who is the owner of, or who is possessed of any interest in any animal affected with any of the diseases named in section 2 of this act, or any person who is agent, common carrier, consignee, or otherwise is charged with any duty in regard to any animal so diseased, or exposed to the contagion of such disease, or any officer or agent charged with any duties under the provisions of this act, who shall knowingly conceal the existence of such contagious disease, or the fact of such exposure to said contagion, and who shall knowingly and willfully fail, within a reasonable time, to report to the said commissioners their knowledge or their information in regard to the existence and location of said disease, or of such exposure thereto, shall be deemed guilty of a misdemeanor, and shall be punishable as provided in section 4 of this act.

SECT. 6. That when the owner of animals, decided under the provisions of this act, by the proper authority, to be dis-

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eased, or to have been exposed to contagion, refuses to accept the sum authorized to be paid under the appraisement provided for in this act, it shall be the duty of the commissioners to declare and maintain a rigid quarantine as to the animals decided as aforesaid to be diseased, or to have been exposed to any contagious or infectious disease, and of the premises or places where said cattle may be found, according to the rules and regulations to be prescribed by said commissioners, approved by the governor, and published as provided in the third section of this act.

SECT. 7. That no person or persons owning or operating any railroad, nor the owner or owners or masters of any steam, sailing, or other vessels, within the state, shall receive for transportation or transport from one part of the state to another part of the state, or to bring from any other state or foreign country any animals affected with any of the diseases named in section 2 of this act, or that have been exposed to such diseases, especially the disease known as tuberculosis, knowing such animals to be affected, or to have been exposed thereto; nor shall any person or persons, company or corporation, deliver for such transportation to any railroad company or to the master or owner of any vessel, any animals, knowing them to be affected with or to have been exposed to any of said diseases; nor shall any person or persons, company or corporation, drive on foot, or transport in private conveyance, from one part of the state to another part of the state any animal, knowing the same to be affected with or to have been exposed to any of said diseases. Any person or persons violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by fine not exceeding the sum of two hundred dollars, or by imprisonment not exceeding six months, or by both fine and imprisonment.

SECT. 8. That it shall be the duty of the several county solicitors to prosecute all violations of this act which shall be brought to their notice or knowledge by any person making the complaint under oath; and the same shall be heard in the supreme court.

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SECT. 9. That the said commissioners are hereby authorized to appoint or elect one of their number as secretary of said board, who shall receive a reasonable compensation for his services during the time in which, under the provisions of this act, the services of the said commissioners shall be required. The said commissioners shall make and preserve a full record of all rules and regulations promulgated under the provisions of this act, of all payments and expenses hereunder incurred, and all other transactions performed by said commissioners in the discharge of their duties as herein provided; and the said commissioners shall, on or before the first Wednesday in January of each year, during their continuance in service, and at other times as they may deem conducive to the public interests, or as they may be required to do by the governor of the state, report to said governor full and accurate accounts of their expenditures, and other proceedings under the provisions of this act, and of the condition of said diseases, if any, in the state, to be communicated by him to the legislature. Whenever the functions of said commission shall be suspended or terminated, it shall turn over to the secretary of state all its books, papers, records, and other effects, taking his receipt therefor, and he shall remain the custodian of the same until such time as the functions of said commission may be restored.

SECT. 10. That the commissioners shall have the power, and are hereby authorized to employ skilled veterinarians, and such other agents and employés as they may deem necessary to carry into effect the provisions of this act, and to fix the compensation of the person or persons so employed, and to terminate such employment at their discretion; and they are authorized to make such expenditures as may be needed for the actual and necessary traveling expenses of themselves and their said employés, stationery, expenses of disinfecting premises, cars, and other places, destroying diseased and exposed animals, and paying for the same, and such other expenses and expenditures as they may find to be actually necessary to carry into effect properly the provisions of this act.

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SECT. 11. That at any time, should it become an actual necessity to declare a quarantine against any or all animals entering within the borders of the state, for the public health and safety, it shall be the duty of said commission to confer with the governor and council, and they may adopt measures to prevent the spread of infectious and contagious diseases in the state, to remain in force until the safety of the state and the approval of the commission and the governor and council allow the repeal of said measures of quarantine.

SECT. 12. That all bills and expenses incurred under the provisions of this act shall be approved by the commission, and audited by the governor and council, and the expenditures shall not exceed ten thousand dollars in any one year, to be paid from the state treasury, on the order of the governor, out of any moneys not otherwise appropriated.

SECT. 13. That chapter 93, Laws of 1889, and all other acts and parts of acts inconsistent with this act are hereby repealed.

CHAPTER 52.

AN ACT PROVIDING FOR THE REMOVAL OF THE NEW HAMPSHIRE COLLEGE OF AGRICULTURE AND THE MECHANIC ARTS FROM HANOVER TO DURHAM, AND FOR OTHER PURPOSES.

Be it enacted by the Senate and House of Representatives in General Court convened:

SECTION 1. The trustees of the New Hampshire College of Agriculture and the Mechanic Arts, located at Hanover, in this state, are hereby instructed and required to terminate the location and agreement made and concluded on the seventh day of April, eighteen hundred and sixty-eight, between the said New Hampshire College of Agriculture and the Mechanic Arts and Dartmouth College, by giving one year's notice of such termination, in writing, to the trustees of Dartmouth

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College as soon as practicable after the time when this act shall take effect, in accordance with the terms of said agreement, and of the act of incorporation of said New Hampshire College of Agriculture and the Mechanic Arts.

SECT. 2. Upon the termination of the location and agreement aforesaid, the said New Hampshire College of Agriculture and the Mechanic Arts and the Experiment Station connected therewith, shall be removed from Hanover to and located upon the "Warner farm," so called, of the late Benjamin Thompson, in the town of Durham, devised by the said Thompson to the state of New Hampshire by his last will and testament.

SECT. 3. The trustees of the New Hampshire College of Agriculture and the Mechanic Arts are hereby authorized and directed to sell, at public or private sale, the real estate, with the buildings thereon, acquired by them by the deed of John Conant, dated September 16, 1870, and recorded in the Grafton county registry of deeds, book 324, page 87, and all other real estate owned by said college in the town of Hanover, reserving the right to occupy the same until the removal of said college as hereinbefore provided, and to invest the proceeds of such sales, so far as the same shall be derived from the sale of the land conveyed to said college by said Conant, in accordance with the terms expressed in his deed, and the balance of said proceeds in aid of the erection and furnishing of buildings for the use of said college upon said Warner farm.

SECT. 4. Upon the termination of the location and agreement aforesaid, the state shall and it does hereby relinquish to the trustees of Dartmouth College all claim to the building known as Culver Hall, erected at Hanover in coöperation with the trustees of Dartmouth College under the provisions and authority of section 6 of an act approved July 9, 1869, entitled "An act to promote the interests of the New Hampshire College of Agriculture and the Mechanic Arts," and thereupon the said trustees of Dartmouth College are hereby requested to refund to the state the sum of fifteen thousand

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dollars appropriated by the act aforesaid in aid of the erection and furnishing of said Culver Hall. The said sum of fifteen thousand dollars, when the same shall be refunded to the state, shall be and is hereby appropriated in aid of the erection and furnishing of the buildings required for the use of said college upon said Warner farm.

SECT. 5. The general government of said college of Agriculture and Mechanic Arts is vested in a board of thirteen trustees, and all vacancies hereafter occurring in said board shall be filled as follows: The governor of the state and the president of said college shall be trustees *ex officio*. The alumni of said college may elect one trustee in such manner as said board may prescribe. He shall be a resident of the state and his term of office shall be three years. All other trustees shall be appointed by the governor, with the advice of the council, one at least from each councilor district, and so classified and commissioned that the office of three trustees shall become vacant annually. Not more than five of the trustees appointed by the governor and council shall belong to the same political party, and at least seven of them shall be practical farmers. Seven members shall constitute a quorum for doing business, and not less than seven affirmative votes shall be required to elect a president of said college.

SECT. 6. The sum of one hundred thousand dollars is hereby appropriated for the removal of said college from Hanover to Durham, and the erection and maintenance of suitable buildings for the purposes of said college; and the treasurer of the state is hereby authorized, under the direction of the governor and council, to issue bonds or certificates of indebtedness in the name and in behalf of the state, for the whole or any part of said sum, in the same manner and subject to the same conditions as are provided in the act approved March 19, 1891, entitled "An act to provide for refunding maturing bonds and authorizing a temporary loan," and said bonds or certificates of indebtedness issued by authority of said act, and those issued by authority of this act, are hereby consolidated into one series, and the governor is authorized to

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draw his warrant on the treasurer for said sum, from time to time, as the same shall be needed, and the same shall be paid to the treasurer of said College of Agriculture and the Mechanic Arts, and expended under the direction of the trustees of said college.

SECT. 7. Section 11 of the act approved March 5, 1891, entitled "An act to accept the provisions of the Thompson will, and to provide for the present disposition of the funds," is hereby amended by striking out the words "The Board of Agriculture is," and inserting in place thereof the words, "The trustees of the New Hampshire College of Agriculture and the Mechanic Arts are," so that said section, as amended, shall read: "Section 11. The trustees of the New Hampshire College of Agriculture and the Mechanic Arts are hereby authorized and directed, in behalf of the state, to receive possession of the real estate in Durham, coming to the state by virtue of said will, and to care for, control, and manage it until it is needed for the uses of the school or college to be established as provided in the will."

SECT. 8. This act shall take effect and be in force from and after the day on which the estate devised and bequeathed to the state by the said Benjamin Thompson shall be turned over to and become the property of the state. The state treasurer is hereby required to notify the trustees of said College of Agriculture and the Mechanic Arts, in writing, of the reception of said estate immediately after it shall be turned over to the state as aforesaid.

SECT. 9. All acts and parts of acts inconsistent with this act are hereby repealed.

CHAPTER 60.

AN ACT TO PREVENT THE DESTRUCTION OF SHEEP AND OTHER DAMAGES BY DOGS.

SECTION 1. Every owner or keeper of a dog three months old or over shall annually, on or before the thirtieth day of

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April, cause to be registered, numbered, described, and licensed for one year from the first day of the ensuing May, in the office of the clerk of the city or town wherein said dog is kept, and shall cause it to wear around its neck a collar distinctly marked with its owner's name and its registered number.

SECT. 2. An owner of a dog may at any time have it licensed until the first day of the ensuing May; and a person becoming the owner or keeper of a dog after the first day of May, not duly licensed, shall cause it to be registered, numbered, described, and licensed as provided in the preceding section.

SECT. 3. The fee for every license for a year shall be two dollars for a male dog and five dollars for a female dog, and such proportionate sum for licenses for dogs becoming three months of age after the first day of May, or which may be brought from out of the state after the first day of May, as the remaining portion of the year bears to the sum required for a license for a whole year.

SECT. 4. Every license issued to the owner of a dog shall have printed thereon a description of the symptoms of the disease in dogs known as hydrophobia, said description to be supplied by the secretary of the state board of health, lunacy, and charity, to the clerks of the several cities and towns, upon application therefor.

SECT. 5. Clerks of cities and of towns shall issue said licenses, and receive the money therefor, and pay the same into the treasuries of their respective towns or cities on or before the first day of June of each year, retaining to their own use twenty cents for each license, and shall return therewith a sworn statement of the amount of moneys thus received and paid over by them. They shall also keep a record of all licenses issued by them, with the names of the keepers or owners of dogs licensed, and the names, registered numbers, and descriptions of all such dogs.

SECT. 6. Each city and town treasurer shall keep an accurate and separate account of all moneys received and expended by him under the provisions of this chapter relating to dogs.

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SECT. 7. A license duly recorded shall be valid in any part of the state, and may be transferred with the dog licensed.

SECT. 8. Whoever keeps a dog contrary to the provisions of this chapter shall forfeit fifteen dollars, five dollars of which shall be paid to the complainant, and ten dollars to the treasurer of the city or town in which the dog is kept.

SECT. 9. Whoever wrongfully removes the collar from or steals a dog licensed and collared as aforesaid shall be punished by fine not exceeding fifty dollars; and whoever wrongfully kills, maims, entices, or carries away such a dog shall be liable to its owner for its value in an action of tort. Whoever distributes or exposes a poisonous substance, with intent that the same shall be eaten by a dog, shall be punished by a fine not less than ten nor more than fifty dollars.

SECT. 10. The assessors shall annually make a list of all dogs owned or kept in their respective cities or towns on the first day of April, with the owners' or keepers' names, and return the same to the city or town clerk on or before the first day of May. An owner or keeper of a dog who refuses to answer or answers falsely to the assessors, relative to the ownership thereof, shall be punished by fine of not less than ten dollars, to be paid into the town treasury.

SECT. 11. The mayor of each city and the selectmen of each town shall annually, within ten days from the first day of May, issue a warrant to one or more police officers or constables, directing them to proceed forthwith either to kill or cause to be killed all dogs within such city or town not licensed and collared according to the provisions of this chapter, and to enter complaint against the owners or keepers thereof; and any person may, and every police officer and constable shall, kill or cause to be killed all such dogs, whenever and wherever found. Such officers, other than those employed under regular pay, shall receive one dollar for each dog so destroyed, from the treasurers of their respective cities or towns. All bills for such services shall be approved by the mayor of the city or the selectmen of the town in which said dogs are destroyed, and shall be paid from moneys received under the provisions of this chapter.

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SECT. 12. Each police officer or constable to whom the warrant named in the preceding section is issued shall return the same on or before the first day of July following, to the mayor or selectmen issuing the same, and shall state in said return the number of dogs killed, and the names of the owners or keepers thereof, and whether all unlicensed dogs in his city or town have been killed under the provisions of this chapter, and whether complaints have been entered against all the persons who have failed to comply with said provisions.

SECT. 13. The mayor of each city and the chairman of the selectmen of each town shall annually, within ten days from the first day of July, transmit a certificate, subscribed and sworn to, stating the issue of the warrant named in section 11, and whether the same has been duly executed and returned agreeably to the provisions of this chapter, to the county solicitor of said county, who shall prosecute all such city and town officers as have failed to comply with said provisions.

SECT. 14. Every owner or keeper of a dog shall forfeit to any person injured by it double the amount of the damage sustained by him, to be recovered in an action of tort.

SECT. 15. Any person may kill a dog that suddenly assaults him while he is peaceably walking or riding without the inclosure of its owner or keeper; and any person may kill a dog that is found out of the inclosure or immediate care of its owner or keeper worrying, wounding, or killing neat cattle, lambs, or other domestic animals.

SECT. 16. Whoever suffers loss by the worrying, maiming, or killing of his sheep, lambs, fowls, or other domestic animals by dogs, may inform the mayor of the city or one of the selectmen of the town wherein the damage was done, who shall proceed to the premises where the damage was done, and determine whether the same was inflicted by dogs, and, if so, appraise the amount thereof if not exceeding twenty dollars; if in the opinion of said mayor or selectmen the amount of said damage exceed twenty dollars, he shall appoint two disinterested persons, who, with himself, shall appraise the amount thereof; and in either case, he shall return a certifi-

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cate of the same, on or before the first day of December, to the selectmen, who, during the month of December, shall examine all such bills, and, if any doubt exists, may summon the appraisers and all parties interested, and make such examination as they may think proper, and shall issue an order upon the treasurer of the town or city in which the damage was done, for the amount, all or any part thereof, as justice and equity may require. The treasurer shall annually, on the first Wednesday of January, pay all such orders in full, if the gross amount received by him for dog licenses and not previously paid out under the provisions of this chapter relating to dogs is sufficient therefor; otherwise he shall pay such amount pro rata upon such orders, in full discharge thereof. The appraisers shall receive from the city or town treasurer, out of moneys received under the provisions of this chapter relating to dogs, one dollar each for every such examination made by them; and the mayor or selectmen acting in the case shall receive twenty cents per mile one way for his necessary travel.

SECT. 17. The owner of sheep, lambs, or other domestic animals worried, maimed, or killed by dogs, shall have his election whether to proceed under the provisions of the preceding section 14 or of section 16; but, having signified his election by proceeding in either mode, he shall not have the other remedy.

SECT. 18. In the absence or sickness of the mayor, it shall be the duty of any one of the aldermen of the city, who may be duly informed of damage supposed to have been done by dogs, to discharge forthwith the duties imposed by section 16 upon the mayor.

SECT. 19. The mayor and aldermen of a city or the selectmen of a town may order that any dog or dogs within the limits of such city or town respectively shall be muzzled or restrained from running at large during such time as shall be prescribed by such order. After passing such order and posting a certified copy thereof in two or more public places in such city or town, or, in case a daily newspaper is pub-

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lished in such city or town, by publishing such copy in such newspaper, the mayor and aldermen or selectmen may issue their warrant to one or more of the police officers or constables of such city or town, who shall, after twenty-four hours from the publication of such notice, kill all dogs found unmuzzled or running at large contrary to such order.

SECT. 20. Said police officers or constables shall be compensated for service under the preceding section as provided in section 16.

SECT. 21. The mayor and aldermen or selectmen may cause special service of any order to be made upon any person, requiring that a dog owned or kept by him shall be muzzled or restrained from running at large, by causing a certified copy of such order to be delivered to him; and if he refuses or neglects for twelve hours thereafter to muzzle or restrain such dog as so required, he shall be punished by a fine not exceeding twenty-five dollars.

SECT. 22. Any city or town officer who refuses or willfully neglects to perform the duties imposed upon him by the provisions of this chapter relating to dogs shall be punished by fine not exceeding one hundred dollars, to be paid into the town treasury. Any person aggrieved by such refusal or neglect on the part of a city or town officer, may report the same forthwith to the county solicitor of his county.

SECT. 23. The city council of any city and any town may make such additional by-laws and regulations concerning the licensing and restraining of dogs as they deem expedient, and may affix penalties not exceeding ten dollars for a breach thereof; but such by-laws and regulations shall relate only to dogs owned or kept in such city or town; and the annual fee required for a license shall in no case be more than one dollar in addition to the sum required by section 3.

SECT. 24. All fines and penalties provided in the preceding sections relating to dogs may be recovered on complaint before a police, district, or municipal court, or (trial) justice in the town or county where the offense is committed.

SECT. 25. This act shall take effect and be in force from and after its passage.

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